Bicycle & Pedestrian Mobility Plan

for the Win-Fred MPO

Prepared by:

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Acknowledgements

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Table of Contents

Executive Summary

In recent years, the Winchester-Frederick region has experienced rapid growth and a resulting surge in demand for walking and bicycling facilities. The recent growth has created dramatic changes in transportation and land use. Roadways throughout the region are experiencing heavier volumes of traffic, causing concerns about the safety of pedestrians and bicyclists. Efforts should be made now to ensure that pedestrians and bicyclists will be able to use the roadway system in the Winchester-Frederick region in the future. As the transportation system is enhanced to accommodate increased volumes of automobiles, it must also be designed to allow people to safely walk and bicycle to their destinations.

Pedestrians in downtown Winchester

The *Win-Fred MPO Bicycle & Pedestrian Mobility Plan* provides a coordinated and strategic approach to the development of a transportation system that accommodates and encourages walking and bicycling throughout the region. The plan identifies a network of walking and bicycling facilities to improve non-motorized access for residents and visitors. Facility design guidelines and policy and program recommendations are provided to support and encourage bicycling and walking.

Why is Walking and Bicycling Important in the Winchester-Frederick Region?

Bicycling and walking is a necessary part of the transportation system in the Winchester-Frederick region.

Walking and bicycling are extremely important to the one third of the local population that does not have access to or use of an automobile. Over 80% of respondents to the online survey that was conducted as a part of this *Plan* responded that if a bicycle trail or signed bicycle route were provided near their home, they would ride on it. Ninety-five percent of respondents indicated that if there was a sidewalk or trail near their home, they would walk on it.

Developing a network of pedestrian and bicycle facilities makes good economic sense for the Winchester-Frederick region.
Bicycle tourism has the potential to bring in significant tourism revenue while not generating overwhelming numbers of automobiles. The implementation of this plan may help prevent the area from suffering negative economic effects as a result of being declared in non-attainment of the 8-hour ozone air quality standard.

Increased bicycling and walking for transportation can help to improve air quality and reduce traffic congestion in the Winchester-Frederick region.
Substituting a bicycling or walking trip for short automobile trip has the potential to reduce automobile emissions drastically, resulting in improved air quality. Air pollution is a serious health threat, contributing to the deaths of 60,000 people nationwide each year.

Bicycling and walking can play a vital role in improving the health of residents of the Winchester-Frederick region.
Residents of this region need opportunities to meet the Surgeon General's recommendation of 30 minutes of physical activity per day in order to help avoid becoming obese. Research conducted in 1999 by the Centers for Disease Control found that "obesity and overweight are linked to the nation's number one killer – heart disease—as well as diabetes and other chronic conditions." The report also states that one reason for Americans' sedentary lifestyle is that "walking and cycling have been replaced by automobile travel for all but the shortest distances."

Bicycling and walking are fun recreational activities for residents of the Winchester-Frederick region.
In the 2006 *Virginia Outdoors Survey*, the residents of the Northern Shenandoah Valley voted walking for pleasure the most popular outdoor activity. In the same statewide survey, bicycling was ranked the 6th most popular outdoor activity.

Statewide Policy & Planning Context

The development of a regional bicycle and pedestrian network is fully supported by state transportation policy goals. On March 18, 2004, the Commonwealth Transportation Board adopted a new state policy for integrating bicycle and pedestrian accommodations into roadway projects (often termed "incidental" improvements – bikeways and sidewalks that are built as part of new roadway construction or roadway reconstruction). This policy essentially reverses previous Virginia Department of Transportation (VDOT) policies which required substantial public and political support for bikeways and sidewalks to be *considered* for inclusion in transportation projects.

The new policy states that, "*VDOT will initiate all highway construction projects with the presumption that the projects shall accommodate bicycling and walking,*" and essentially requires bicycle and/or pedestrian accommodations whenever a roadway project occurs in an urban or suburban area.

Planning Process

The planning process for this project involved a number of different activities and outreach efforts. The process is briefly outlined below.

- *Field Analysis:* Analysis of existing conditions
- *Steering Committee:* A series of meetings with City, County and staff and other individuals who do pedestrian and bicycle related work locally
- *Stakeholder Meeting:* A large meeting with organizations affected by this Plan
- *Outreach Meetings:* Small meetings with persons and groups with an interest in the Plan and who were unable to attend the Stakeholder Meeting
- *Public Involvement:* Online questionnaire and public meetings

Vision, Goals, and Objectives

Vision Statement

The Winchester-Frederick region will become a place:

- *where bicycle and pedestrian facilities serve a dual purpose as recreation and transportation corridors, and;*
- *where people have the convenient and safe option of traveling on foot and by bicycle throughout the region.*

The following goals build on the strengths of the Winchester-Frederick region, and are designed to help achieve the vision for improving pedestrian and bicycle accommodations in the region.

GOAL 1, CONNECTIVITY: Develop a regional walkway, bikeway, and greenway network among residential neighborhoods, workplaces, shopping centers, historic sites and districts, schools, libraries, recreation centers, parks, battlefield sites, and other destinations, including linkages to neighboring jurisdictions.

GOAL 2, PRESERVATION OF COMMUNITY CHARACTER AND THE ENVIRONMENT: Preserve the unique character of the Winchester-Frederick region and protect the environment by encouraging pedestrian and bicycle travel and designating greenway and open space corridors.

Pedestrians in Winchester

GOAL 3, ECONOMIC DEVELOPMENT: Improve pedestrian and bicycle accommodations to support local businesses and to provide more opportunities for recreation-based and heritage tourism.

GOAL 4, HEALTH: Provide opportunities and encouragement for the region's residents to walk, bicycle, skate, run, and gain the health benefits of incorporating physical activity into their daily lives.

GOAL 5, SAFETY: Minimize the number of pedestrian and bicycle crashes and injuries while increasing the amount of pedestrian and bicycle activity in the region through improved facilities and education targeted at multiple users (motorists, bicyclists, and pedestrians).

Existing Conditions for Walking and Bicycling in the Winchester-Frederick Region

The Winchester-Frederick region offers numerous opportunities for walking and bicycling for both recreation and transportation. Many area residents use non-motorized transportation modes to access local parks, schools, shops, and workplaces in their communities. Residents and visitors walk to experience historic downtown Winchester.

Non-motorized transportation and recreation opportunities are provided throughout the Winchester-Frederick area. However, there are also many barriers to pedestrian and bicycle access, including the absence of important facilities, such as sidewalks and bicycle lanes on key roadways, disconnected street networks, and automobile-oriented developments.

Low density, single use development in the Winchester-Frederick area is creating a deterrent to walking and bicycling due to long travel distances between origins and destinations. Housing communities are often isolated from services, workplaces and schools, and are divided by wide arterials that are uncomfortable for walking and bicycling. Many of the existing suburban areas in the region will require substantial retrofit to accommodate and encourage walking and bicycling. Measures should be taken now to ensure that newly developed areas are designed to accommodate pedestrians and bicyclists.

Short Term Sidewalk Installation and Reconstruction (including ADA improvements)

The following table identifies priorities for sidewalk improvement, reconstruction, and ADA improvements in the short term. Each location identified for short term sidewalk installation and rehabilitation will require further study to determine the scope of the necessary improvement. This should happen as part of the design process. The short term improvements identified represent an aggressive schedule for improvements. Improvements or portions of improvements that cannot be completed in the short term may become longer-term projects. Opportunities may arise to construct these improvements (or other improvements not listed below) as part of other roadway projects, presenting the opportunity to install new sidewalks, complete ADA improvements, or rehabilitate existing sidewalks at a **greatly** reduced cost.

Short Term Sidewalk Installation, Reconstruction, and ADA Improvements

Street Name	From	To	Improvement	Length	Est. Cost*
City of Winchester					
E. Cork Street	City of Winchester Eastern Border	Purcell Ave/Maple Dr	New sidewalk or bike/walk path along City Park frontage on S. side	0.3	$54,000
	Purcell Ave/Maple Dr	S. Pleasant Valley Road	Reconstruct/widen sidewalks. Provide ADA improvements on both sides	0.1	$35,000
	S. Pleasant Valley Road	S. East Lane	New sidewalk on N. side and ADA improvements on S. side	0.4	$74,000
Valley Avenue, Rt. 11	W. Gerrard Street	Bellview Ave	Replace sections damaged by tree roots and provide ADA improvements for walks on both sides	0.7	$7,000
	Bellview Ave	Middle Road	Reconstruct/provide ADA improvements for walks on both sides. New walk in front of 2011 Valley Ave	0.8	$280,000
	Middle Road	City of Winchester Border	Infill new sidewalks on both sides	1.4	$336,600
Middle Road	Valley Ave	Crestview Terrace	Install new sidewalk on both sides	2.4	$840,000
	Crestview Terrace	Nazarene Drive	New sidewalk on east side. Infill missing sidewalk segments on W. side.	0.4	$132,000
	Nazarene Drive	City of Winchester Border	Install sidewalk on west side. Install missing segment of sidewalk or bike/walk path on E. side.	0.2	$38,000
Cedar Creek Grade	Valley Avenue	City of Winchester Border	Provide ADA and maintenance improvements for sidewalks on both sides (reconstruct and widen portions near tree wells if necessary)	1.5	$15,000
Pleasant Valley Road	Papermill Road	Berryville Avenue	Reconstruct/provide ADA improvements for existing sidewalks on both sides	2.9	$870,000
E. Jubal Early Drive	S. Loudoun Street	Millwood Avenue	Provide ADA and maintenance improvements for existing walks on both sides	0.7	$7,000
Amherst Street	N. Braddock Street	Entrance to Museum of Shenandoah Valley	Provide ADA and maintenance improvements for sidewalks on both sides (reconstruct portions if necessary)	0.6	$30,000
	Entrance to Museum of Shenandoah Valley	City of Winchester Border	Install new sidewalk and/or bike/walk path on S. side. Infill missing walk on N. side.	1.2	$312,000
S. Loudoun Street	Jubal Early Drive	Weems Lane	Install new sidewalks on both sides as part of VDOT project	0.4	N/A
	Piccadilly St	North Ave	Reconstruct sidewalks on both sides	0.3	$105,000
	Cork St	Gerrard St	Reconstruct sidewalks on both sides	0.4	$140,000
S. Kent St	E. Cork St	Millwood Avenue	Reconstruct sidewalks on both sides	0.4	$140,000
Woodstock Lane	N. East Lane	N. Pleasant Valley Rd	Infill new sidewalk on N. side	0.3	$54,000
National Ave	N. East Lane	N. Pleasant Valley Rd	Reconstruct sidewalks on both sides	0.4	$140,000
Town of Stephens City					
Main Street, Rt. 11	Town of Stephens City Northern Border	Barley Drive	Install new sidewalks on both sides of road	0.6	$210,000
	Barley Drive	Newtown Court	Install new sidewalk on E. side of road	0.5	$90,000
	Newtown Court	Stephens Run Street	Reconstruct/provide ADA improvements for existing sidewalks on both sides of the road	0.6	$196,000
Frederick County (within WinFred MPO)					
Senseny Road	Greenwood Road	City of Winchester Line/E. Cork Street	Install new sidewalks on both sides of road	1.6	$560,000
Front Royal Pike, Rt. 522	Millwood Pike, Rt. 50	Clarke County Line	Install new sidewalks on both sides of road	7.0	$2,450,000
Valley Pike, Rt. 11	City of Winchester Southern Border	Musket Drive	Install new sidewalks on both sides of road	2.6	$910,000
Middle Road	City of Winchester Western Border	Powder Horn Lane	Install new sidewalks on both sides of road	1.2	$420,000
Cedar Creek Grade	City of Winchester Western Border	Rt. 37	Install new sidewalks on both sides of road	0.9	$315,000
Greenwood Road	Berryville Pike	Edmonson Lane	Install new sidewalks on both sides of road	2.1	$745,500

***Note: Cost estimates are provided for planning purposes only. These estimates assume that each project would be independently funded. However, due to the more common practice of incorporating bicycle and pedestrian facilities into larger street construction projects, as well as the involvement of private developers in constructing these facilities in many locations, the costs shown above are in many cases much higher than the actual cost of implementing projects.**

Short Term Bicycle Facilities

The locations in the following tables have been identified for on-street bicycle facilities in the short term. Additional traffic analysis will be needed in some cases to determine the optimum design for specific locations. Some locations may be determined, after more detailed analysis, to require different or more costly improvements and therefore may become longer-term projects. Additional opportunities not shown on the map may also arise during repaving and other roadway projects, presenting the opportunity to reallocate roadway space for bicycles. Costs shown in this section may be **greatly** reduced by incorporating new bicycle facilities into roadway resurfacing and rehabilitation projects as an improvement incidental to the larger project.

Short Term Bicycle Facilities

Street Name	From	To	Improvement	Length (miles)	Est. Cost*
City of Winchester					
Valley Avenue, Rt. 11	S. Braddock Street	City of Winchester Southern Border	Bike Lanes	2.6	$79,200
S. Loudoun Street	Jubal Early Drive	Weems Lane	Bike Lanes	0.6	$18,900
Papermill Road	Weems Lane	S. Pleasant Valley Road	Bike Lanes	0.6	$18,600
Papermill Road	S. Pleasant Valley Road	City of Winchester Eastern Border	Bike Lanes	0.6	$18,600
Pleasant Valley Road	Berryville Ave	Papermill Road	Bike Lanes	2.9	$85,500
Cork Street	City of Winchester Eastern Border	S. Washington Street	Bike Lanes	1.3	$38,100
Amherst Street	City of Winchester Western Border	W. Boscawen Street	Bike Lanes	1.4	$42,000
W. Boscawen Street	Amherst Street	N. Washington Street	Bike Lanes	0.3	$7,500
Cedar Creek Grade	City of Winchester Western Border	Valley Ave	Bike Lanes	0.5	$15,900
Jubal Early Drive	S. Pleasant Valley Road	Meadow Branch Ave	Bike Lanes	1.4	$42,600
Jubal Early Drive	Valley Ave	Meadow Branch Ave	Add Missing Segments to Existing Shared Use Path	0.7	$110,000
Middle Road	Valley Ave	City of Winchester Western Border	Bike Lanes and/or add Missing Segments to Existing Shared Use Path	1.0	Bike Lanes: $30,000; Missing Segments Shared Use Path: $255,000
Campus Boulevard	Amherst Street	Winchester Medical Center/Wellness Center	Bike Lanes	0.7	$20,400
Town of Stephens City					
Main Street, Rt. 11	Town of Stephens City Northern Border	Town of Stephens City Southern Border	Bike Lanes	1.8	$52,500
Fairfax Street	Main Street	Town of Stephens City Eastern Border	Bike Lanes	0.1	$4,200

***Note: Cost estimates are provided for planning purposes only. These estimates assume that each project would be independently funded. However, due to the more common practice of incorporating bicycle and pedestrian facilities into larger street construction projects, as well as the involvement of private developers in constructing these facilities in many locations, the costs shown above are in many cases much higher than the actual cost of implementing the projects.**

Short Term Bicycle Facilities, Continued

Street Name	From	To	Improvement	Length (miles)	Est. Cost*
Frederick County (within WinFred MPO)					
Valley Pike, Rt. 11	City of Winchester Southern Border	Town of Stephens City Northern Border	Bike Lanes	2.9	$86,100
Valley Pike, Rt. 11	Town of Stephens City Southern Border	MPO Southern Border	Bike Lanes	1.5	$43,500
Front Royal Pike (522)	Millwood Pike, Rt. 50	Clarke County Western Border	Bike Lanes	7.1	$212,400
Front Royal Pike (522)	Proposed Trail north of Clydesdale Drive	Tasker Road	Shared Use Path	1.5	$46,200
Senseny Road	City of Winchester Eastern Border	Clarke County Western Border	Bike Lanes	3.7	$110,438
Cedar Creek Grade	City of Winchester Western Border	Rt. 37	Bike Lanes	1.0	$30,900
Cedar Creek Grade	Proposed Trail near Winchester Western Border	Proposed Trail to the east of Rt. 37	Shared Use Path	0.6	$197,200
Middle Road	City of Winchester Western Border	MPO Western Border	Bike Lanes	1.8	$52,500
Apple Valley Road	Middle Road	Valley Pike	Bike Lanes	1.2	$36,898
Greenwood Road	Berryville Pike, Rt. 7	Sulphur Spring Road	Bike Lanes	3.0	$89,880
Northwestern Pike, Rt. 50	City of Winchester Western Border	Round Hill Road	Shared Use Path	0.7	$238,000
Northwestern Pike, Rt. 50	Round Hill Road	MPO Western Border	Bike Lanes	3.9	$117,000
Frederick Pike (Route 522)	City of Winchester Northern Border	Indian Hollow Road	Shared Use Path	2.1	$720,800
Frederick Pike (Route 522)	Indian Hollow Road	MPO Western Border	Bike Lanes	1.7	$49,500
Valley Mill Road	Berryville Pike, Rt. 7	Berryville Pike, Rt. 7	Bike Lanes	3.0	$91,320
Valley Mill Road	Greenwood Road	Proposed Trail near the Rt. 37 extension	Shared Use Path	1.9	$646,000
Airport Road	Front Royal Pike, Rt. 522	Millwood Pike, Rt. 50	Bike Lanes	3.8	$113,100
Victory Road	Millwood Pike	Airport Road	Bike Lanes	0.8	$22,500
Independence Road	Victory Road	Millwood Pike, Rt. 50	Bike Lanes	0.5	$15,472
Tasker Road	Route 37	Front Royal Pike, Rt. 522	Bike Lanes	4.6	$136,875
Aylor Road	Tasker Road	Fairfax Pike	Share Use Path	2.1	$709,920
Fairfax Pike	Town of Stephens City Eastern Border	Clarke County Western Border	Bike Lanes	4.5	$136,170
Sherando Lane	Sherando Park	Double Church Road	Bike Lanes	0.7	$22,287
Apple Pie Ridge Road	Frederick Pike, Rt. 522	Hiatt Road	Bike Lanes	3.8	$114,321
Warrior Drive	Sherando High School (South of Fairfax Pike)	Craig Drive (Connect to Proposed Trail to the North)	Bike Lanes	1.9	$56,100
Papermill Road	City of Winchester Eastern Border	Front Royal Pike, Rt. 522	Bike Lanes	1.3	$40,200

***Note: Cost estimates are provided for planning purposes only. These estimates assume that each project would be independently funded. However, due to the more common practice of incorporating bicycle and pedestrian facilities into larger street construction projects, as well as the involvement of private developers in constructing these facilities in many locations, the costs shown above are in many cases much higher than the actual cost of implementing projects.**

Short Term Shared-Use Paths

The Winchester Green Circle Trail is currently under development. This is a high-priority project and as much of the trail as possible should be completed in the next five years.

In the short term, most of the proposed shared use paths shown on the Proposed Bicycle & Pedestrian Network Map should be constructed as part of the development process. Local governments should also begin securing capital budget items for future use as

matches for Transportation Enhancement grants. In the medium term, missing trail segments should be identified and this funding can be used to pursue the development of these missing links and new trail construction projects, such as the Rt. 37 Loop Trail.

Short Term Roadway Crossing Improvements (Including ADA Improvements)

The locations identified below should be prioritized for roadway crossing improvements. Roadway crossing improvements include ADA curb ramps, pedestrian countdown signals, raised medians, and other improvements (as recommended in Appendix A of this plan) to improve the safety of pedestrians and bicyclists crossing the roadway.

City of Winchester:

- S. Pleasant Valley Road and E Cork Street
- E. Cork Street and N. Purcell Ave
- S. Pleasant Valley Road and Lowry Drive/Hollingsworth Drive
- S. Pleasant Valley Road and E. Jubal Early Drive
- Apple Blossom Drive and E. Jubal Early Drive
- Jubal Early Drive and S. Loudoun Street
- W. Jubal Early Drive and Valley Avenue
- Millwood Avenue at Shenandoah University (Frontage Road)
- W. Piccadilly Street and N. Braddock Street
- Amherst Street and W. Boscawen Street
- Amherst Street and Whittier Avenue
- Amherst Street and Meadow Branch Avenue

Frederick County (Within the WinFred MPO):

- Berryville Pike at Eastern border of Frederick County
- Berryville Pike and Interstate 81
- Papermill Road at Interstate 81
- Millwood Pike and Inverlee Way
- Northwestern Pike, Rt. 50 near Rt. 37
- Rt. 37 and Frederick Pike (522)
- Rt. 37 near Winchester Medical Center
- Apple Pie Ridge Road and Frederick Pike
- Middle Road and Rt. 37
- Cedar Creek Grade and Rt. 37

Short Term Policies

The policies identified below are meant to serve as the first step to ensuring that local design guidelines, ordinances, regulations, and other policies are supportive of including facilities for pedestrians and bicycles.

- *Development Review*: The Town, City, County, and VDOT should continue to ensure that transportation and recreation facilities accommodate pedestrians and bicycles during development projects and roadway construction and upgrades.
- *Pedestrian And Bicycle Liaisons:* The City and County should each designate one existing staff person as Pedestrian and Bicycle Liaison.
- *Pedestrian And Bicycle Advisory Committee:* A new ad hoc Pedestrian and Bicycle Advisory Committee should be formed to assist the Pedestrian and Bicycle Program liaisons.
- *Revise Ordinances:* Frederick County, City of Winchester, and Town of Stephens City should revise their comprehensive plans, subdivision ordinances, and zoning ordinances to ensure better accommodations for pedestrians and bicycles. Developer-provided pedestrian and bicycle accommodations should meet the new design standards.
- *Develop A Maintenance Program*: The City and County should develop a schedule for maintaining pedestrian and bicycle facilities.
- *Provide Training And Professional Development:* Conduct regional pedestrian and bicycle training periodically, and encourage staff to attend conferences with educational opportunities on pedestrian and bicycle facility planning and design, and encourage the Pedestrian and Bicycle Liaisons to join the Association of Pedestrian and Bicycle Professionals (APBP).
- *Pursue Additional Funding:* Pursue additional grant sources and capital funding as necessary to supplement developer-financed pedestrian and bicycle facilities.

Short Term Programs (Education, Encouragement, Enforcement)

The education, encouragement, and enforcement strategies identified below are recommended to be implemented within the next five years. These programs are intended to promote and increase the safety of walking and bicycling locally.

- *Seek Funding To Initiate A Safe Routes To School Program:* The Pedestrian and Bicycle Program Liaisons should work with local schools to apply to VDOT for Federal grant funding to establish a SRTS pilot program at local schools.
- *Unify And Strengthen Existing Education Programs:* Groups that are already organizing education/encouragement events such as the Winchester Green Circle Fall Fitness Fair and Valley Health's Community Wellness Festival should coordinate on event dates and themes to reinforce new messages each year.
- *Walk And Bicycle To School Day:* The Pedestrian and Bicycle Program Liaisons should work with local schools to increase participation in International Walk and Bicycle to School Day (held each year in October).
- *Bicycle And Walking Rodeos*: Existing bicycle and walking rodeos should continue and more should be conducted each year.
- *Pedestrian And Bicycle Safety Education In Schools*: The Pedestrian and Bicycle Program Liaisons should work with the schools to incorporate bicycle and pedestrian safety education in elementary and middle schools throughout the area. Grant funding may be needed to support this activity.

- *Bicycle Safety Education For Adults:* The MPO should work with the Winchester Wheelmen to sponsor and promote adult cycling classes offered by the Virginia Bicycling Federation.
- *Pedestrian And Bicycle Awareness Campaign:* The MPO should investigate partnering with the metropolitan Washington Council of Governments on the Street Smart Pedestrian and Bicycle Safety Public Awareness Campaign.
- *Safety Awareness Week:* Law Enforcement officers should conduct a "Focus on Pedestrians" safety campaign.
- *Corridors-To-Campus Initiative:* Working with University officials, the PBAC should support a corridors-to-campus initiative designed to identify, and implement strategies to support walking and bicycling to and from Shenandoah University and between the campus locations.

Medium Term Recommendations (0 to 10 years)

There are a number of recommended projects and programs that are very important for improving pedestrian and bicycle conditions in the Winchester-Frederick region, but are likely to take longer to implement than the short term initiatives. These projects and programs are classified as medium term recommendations. Though these recommendations are designed for a 10-year timeframe, the Town, City, and County should take advantage of opportunities that arise to implement the projects and programs sooner.

Medium Term Sidewalk Installation and Reconstruction (Including ADA Improvements)

The locations in the Table below have been identified for sidewalk installation, reconstruction, and ADA improvements in the medium term. (Refer to the maps in Chapter 5 for project limits)

City of Winchester:

- Berryville Avenue (S. Pleasant Valley Road to City of Winchester eastern border)
- N. East Lane (National Ave to E. Piccadilly Street)
- Piccadilly Street (N. East Lane to Fairmont Ave)
- Merrimans Lane (City of Winchester western border to Meadow Branch Ave)
- Millwood Avenue (Lowry Drive to City of Winchester eastern border)
- Washington Street (W. Fairfax Lane to Handley Boulevard)
- Fairmont Avenue (W Piccadilly Street to City of Winchester north border)
- N. Loudoun Street (N. Cameron Street to City of Winchester north border)
- Papermill Road (S. Loudoun Street to S. Pleasant Valley Road)

Town of Stephens City:

- Fairfax Street (Main Street to Town of Stephens City eastern border)

Frederick County (within the WinFred MPO):

- Frederick Pike, Rt. 522 (Fairmont Ave to Long Green Lane)
- Berryville Pike (City of Winchester eastern border to Greenwood Road)
- Merrimans Lane (Orchard Lane to City of Winchester western border)
- Millwood Pike (City of Winchester eastern border to Arbor Court)
- Warrior Drive (Fairfax Pike to Tasker Road)
- Fairfax Pike (Town of Stephens City western border to Line Drive)
- Tasker Road (Rutherford Lane to White Oak Road)
- Aylor Road (Tasker Road to Village Lane)
- Northwestern Pike, Rt. 50 (western border of City or Winchester to Spinning Wheel Lane)
- Martinsburg Pike (City of Winchester north border to Park Center Drive)

Medium Term Bicycle Facilities

The locations in the Table below have been identified for on-street bicycle facilities in the medium term. (Refer to the maps in Chapter 5 for project limits)

City of Winchester:

- Millwood Avenue
- Berryville Avenue, Rt. 7
- Merrimans Lane
- Loudoun Street (portions not completed during the short term)
- Braddock Street
- Washington Street
- Handley Boulevard
- Fox Drive

Frederick County (within the WinFred MPO):

- Rt. 37 Trail (along existing and proposed bypass)
- Martinsburg Pike (Route 11)
- Millwood Pike
- Berryville Pike, Rt. 7
- Merrimans Lane
- Sulphur Spring Road
- Fox Drive
- Echo Lane
- Glentawber Road
- Old Charles Town Road
- Milburn Road
- Jordan Springs Road/Stephenson Road
- Woods Mill Road
- Double Church Road
- Brandy Lane

- Shady Elm Road
- Redbud Road
- Indian Hollow Road
- Welltown Road
- Hiatt Road
- Rest Church Road
- Hopewell Road
- Brucetown Road
- Ivory Drive
- Macedonia Church Road
- White Oak Road
- Hudson Hollow Road
- Forest Lake Drive
- Town Run Lane

Medium Term Shared-use Paths

As mentioned previously, in the short term, most of the proposed shared use paths shown on the Proposed Bicycle & Pedestrian Network Map should be constructed as part of the development process. In the medium term, missing trail segments should be identified and developed. New trail construction projects should also be developed in the medium term, such as the Rt. 37 Loop Trail. The cost for filling gaps in shared-use paths is expected to be approximately $340,000 per mile.

Medium Term Roadway Crossing Improvements

The locations identified below should be prioritized for roadway crossing improvements in the medium term. Roadway crossing improvements include ADA curb ramps, pedestrian countdown signals, raised medians, and other improvements (as recommended in Appendix A of this plan) to improve the safety of pedestrians and bicyclists crossing the roadway. (Refer to the maps in Chapter 5 for project limits)

City of Winchester:

- N. Pleasant Valley Road and Berryville Avenue/National Avenue
- N. Pleasant Valley Road and Woodstock Lane
- S. Pleasant Valley Road and Millwood Avenue
- Berryville Avenue near Elm Street/Fort Collier Road
- Featherbed Lane and S. Loudoun Street

Frederick County (within the WinFred MPO):

- Interstate 81 crossing at proposed trail to the south of Rt. 37
- Interstate 81 crossing at proposed trail to the south of Martinsburg Pike
- Interstate 81 crossing at proposed trail to the north of Papermill Road
- Interstate 81 crossing at proposed trail to the south of Papermill Road
- Interstate 81 crossing at proposed trail to the north of Stephens City

- Rt. 37 crossing at proposed trail coming from Abrams Creek Wetlands Preserve
- Rt. 37 crossing at proposed trail near Martinsburg Pike
- Proposed crossing of the Rt. 37 trail with Berryville Pike

Medium Term Policies and Planning

The policies identified below are meant to serve as the second step to ensuring that local design guidelines, ordinances, regulations, and other policies are supportive of including facilities for pedestrians and bicycles.

- *Revise The Pedestrian & Bicycle Mobility Plan:* The Pedestrian & Bicycle Mobility Plan should be updated once every 10 years to respond to changing local conditions.
- *Maintenance Website And Hotline:* Once a regular schedule for pedestrian and bicycle facility maintenance is established, a website and phone hotline should be established to allow residents to report maintenance problems and request spot repairs.
- *Maintenance Manager:* As need arises, the County should identify a lead staff person as a Maintenance Manager to organize and keep track of both regular and remedial inspection and maintenance of the pedestrian and bicycle network.
- *Trend-Setter Policy*: The Town, City, and County can serve as trend-setters by becoming early implementers of some of the recommendations in this plan, such as the provision of bicycle parking racks near their facilities, and offering incentives to people who walk or bike to work.
- *ADA Transition Plan:* The Town, City, and County should complete an Americans Disabilities Act (ADA_ plan for the elements of the public right of way.

Medium Term Programs (Education, Encouragement, Enforcement)

The education, encouragement, and enforcement strategies identified below are recommended to be implemented in the medium term. These programs are intended to promote and increase the safety of walking and bicycling locally.

- *Safety City:* The Pedestrian and Bicycle Program Liaisons could apply for grant funding to install and run a permanent “Safety City” program in order to provide pedestrian and bicycle education to children.
- *Media Outreach And Website:* The Pedestrian and Bicycle Advisory Committee (PBAC) should develop a media outreach plan to promote bicycling and walking and to educate various constituencies throughout the region.
- *Employee Pedestrian And Bicycle Commute Incentives Program:* The City of Winchester and Frederick County should encourage pedestrian and bicycle commuting by providing information about economic benefits, health benefits, and potential commuting routes to employers and employees.

- *Initiate An Adopt-A-Trail Program:* In order to support pedestrian and bicycle facilities, the City of Winchester and Frederick County should implement an "Adopt-a-Trail" program.
- *Bicycle And Walking Maps:* The Win-Fred MPO, the Tourism Board, the Convention and Visitors Bureau and/or local agencies should partner with the Chamber of Commerce develop maps of walking and bicycling routes. Existing maps should be updated periodically, and new maps should be developed.
- *Community Events:* The Pedestrian and Bicycle Program Liaisons should work with the PBAC, the Winchester Wheelmen, the Winchester Green Circle and local volunteer groups to sponsor regular rides and events in the Winchester-Frederick area.
- *Community Advocacy Programs*: The Winchester Wheelmen and the Shenandoah Valley Runners can take the lead in developing a community-wide advocacy program to raise awareness of bicycle and pedestrian issues.
- *Crosswalk Enforcement Programs:* Educate law enforcement officers about how to conduct a crosswalk enforcement program.
- *Involve Law Enforcement In SRTS Activities*: Law enforcement officers with the City and County should actively participate in Safe Routes to School (SRTS) programs.

Long Term Recommendations (0 to 25 years)

Long term recommendations include filling additional sidewalk gaps, adding additional on-street bicycle facilities, and constructing much of the off-street trail system that is shown on the maps in Chapter 5.

While these recommendations may be included in the long term category, there may be opportunities for implementing them sooner. For example, pedestrian and bicycle facilities could be added as a part of a new roadway project added to the Transportation Improvement Program or a new pedestrian and bicycle program could be provided by applying to a new grant funding source. The Town, City, and County should take advantage of these opportunities for implementation.

Programs that began in the first 10 years of implementation should grow in the long term. Refinements should be made based on lessons learned during the first 10 years.

Chapter 1: Introduction

In recent years, the Winchester-Frederick region has experienced rapid growth and a resulting surge in demand for walking and bicycling facilities. The recent growth has created dramatic changes in transportation and land use. Traffic is increasing throughout the region, causing concerns that roads are becoming less safe for bicycling and walking even as the demand for these modes increases. Efforts should be made now to ensure that pedestrians and bicyclists will be able to use the roadway network in the Winchester-Frederick area in the future. As the transportation system is enhanced to accommodate increased volumes of automobiles it should also be designed to allow people to safely walk and bicycle to their destinations.

Pedestrians in downtown Winchester

The *Win-Fred MPO Bicycle & Pedestrian Mobility Plan* provides a coordinated and strategic approach to the development of a transportation system that accommodates and encourages walking and bicycling throughout the region. The plan identifies a network of walking and bicycling facilities to improve non-motorized access for residents and visitors. Facility design guidelines and policy and program recommendations are provided to support and encourage bicycling and walking.

Why is Walking and Bicycling Important in the Winchester-Frederick Region?

Bicycling and walking is a necessary part of the transportation system in the Winchester-Frederick region.

Walking and bicycling are extremely important to the one third of the local population that does not have access to or use of an automobile. Over 80% of respondents to the online survey that was conducted as a part of this *Plan*

responded that if a bicycle trail or signed bicycle route were provided near their home, they would ride on it. Ninety-five percent of respondents indicated that if there was a sidewalk or trail near their home, they would walk on it.

Developing a network of pedestrian and bicycle facilities makes good economic sense for the Winchester-Frederick region.
Bicycle tourism has the potential to bring in significant tourism revenue while not generating overwhelming numbers of automobiles. The implementation of this plan may help prevent the area from suffering negative economic effects as a result of being declared in non-attainment of the 8-hour ozone air quality standard.

Increased bicycling and walking for transportation can help to improve air quality and reduce traffic congestion in the Winchester-Frederick region.
Substituting a bicycling or walking trip for a short automobile trip has the potential to reduce automobile emissions, resulting in improved air quality. Air pollution is a serious health threat, contributing to the deaths of 60,000 people nationwide each year.

Bicycling and walking can play a vital role in improving the health of residents of the Winchester-Frederick region.
Residents of this region need opportunities to meet the Surgeon General's recommendation of 30 minutes of physical activity per day in order to help avoid becoming obese. Research conducted in 1999 by the Centers for Disease Control found that "obesity and overweight are linked to the nation's number one killer – heart disease—as well as diabetes and other chronic conditions." The report also states that one reason for Americans' sedentary lifestyle is that "walking and cycling have been replaced by automobile travel for all but the shortest distances."

Planning Process

The planning process for this project involved a number of different activities and outreach efforts. The process is briefly outlined below.

- *Field Analysis:* Analysis of existing conditions
- *Steering Committee:* A series of meetings with City, County and staff and other individuals who do pedestrian and bicycle related work locally
- *Stakeholder Meeting:* A large meeting with organizations affected by this Plan
- *Outreach Meetings:* Small meetings with persons and groups with an interest in the Plan and who were unable to attend the Stakeholder Meeting
- *Public Involvement:* Online questionnaire and public meetings (results from the questionnaire can be found in Appendix D)

Bicycling and walking are fun recreational activities for residents of the Winchester-Frederick region.

In the 2006 *Virginia Outdoors Survey*, the residents of the Northern Shenandoah Valley voted walking for pleasure the most popular outdoor activity. In the same statewide survey, bicycling was ranked the 6th most popular outdoor activity.

Statewide Policy & Planning Context

Transportation agencies have provided a tremendous level of support and funding for bikeways, greenways, and sidewalks in recent years. While local jurisdictions play a large role in establishing transportation priorities in Virginia, the Virginia Department of Transportation (VDOT) is the agency responsible for constructing and maintaining many of the primary and secondary roads throughout the Winchester-Frederick area.

The development of a regional bicycle and pedestrian network is fully supported by state transportation policy goals. On March 18, 2004, the Commonwealth Transportation Board adopted a new state policy for integrating bicycle and pedestrian accommodations into roadway projects (often termed "incidental" improvements – bikeways and sidewalks that are built as part of new roadway construction or roadway reconstruction). This policy essentially reverses previous VDOT policies which required substantial public and political support for bikeways and sidewalks to be *considered* for inclusion in transportation projects.

The new policy states that, "*VDOT will initiate all highway construction projects with the presumption that the projects shall accommodate bicycling and walking,*" and essentially requires bicycle and/or pedestrian accommodations whenever a roadway project occurs in an urban or suburban area. The policy provides some exemptions under which facilities may *not* be provided, such as in situations where:

- Scarcity of population, travel, and attractors, both existing and future, indicate an absence of need for such accommodations
- Environmental or social impacts outweigh the need for these accommodations
- Safety would be compromised
- Total cost of bicycle and pedestrian accommodations to the appropriate system (i.e, interstate, primary, secondary, or urban system) would be excessively disproportionate to the need for the facility
- Purpose and scope of the specific projects do not facilitate the provision of such accommodations (e.g., projects for the Rural Rustic Road Program)
- Bicycle and pedestrian travel is prohibited by state or federal laws

VDOT's new policy applies to all projects that reach the scoping phase after the adoption date of March 18, 2004. As with all major policy changes, it will likely take several years before the "on the ground" results of VDOT's new policy will be evident as projects move through the process from initial scoping, through the planning and design phases, and eventually into construction.

It is critical that local governments continue to show support for the inclusion of bicycle and pedestrian accommodations in state roadway projects. This includes projects at all levels: maintenance, design and construction, and operations. The level of accommodation provided in VDOT projects is likely to be commensurate with the level of support expressed by local citizens, agency staff, and elected officials. Moreover, for projects occurring along corridors that have been planned to receive bike/ped improvements, VDOT's implementation guidance allows for using up to 20% of the total project cost for the bicycle and/or pedestrian accommodation. For projects not taking place along planned bike/ped corridors, the ceiling is 10% of total project cost.

The complete version of VDOT's *Policy for Integrating Bicycle and Pedestrian Accommodations* can be found on the VDOT website in the Program section of the website, under Bicycling and Walking. www.virginiadot.org/bikepedpolicy)

Federal transportation policies also support the development of a regional bicycle plan. The U.S. Congress has provided a consistent source of funding for these activities for the past ten years through programs such as Transportation Enhancements, the Recreational Trails Program, and Safe Routes to School.

Vision, Goals, and Objectives

Vision Statement

The Winchester-Frederick region will become a place:

- *where bicycle and pedestrian facilities serve a dual purpose as recreation and transportation corridors, and;*
- *where people have the convenient and safe option of traveling on foot and by bicycle throughout the region.*

The following goals build on the strengths of the Winchester-Frederick region, and are designed to help achieve the vision for improving pedestrian and bicycle accommodations in the region.

Goal 1, Connectivity: Develop a regional walkway, bikeway, and greenway network among residential neighborhoods, workplaces, shopping centers, historic sites and districts, schools, libraries, recreation centers, parks, battlefield sites, and other destinations, including linkages to neighboring jurisdictions.

Goal 2, Preservation Of Community Character And The Environment: Preserve the unique character of the Winchester-Frederick region and protect the environment by encouraging pedestrian and bicycle travel and designating greenway and open space corridors.

Goal 3, Economic Development: Improve pedestrian and bicycle accommodations to support local businesses and to provide more opportunities for recreation-based and heritage tourism.

Pedestrians in Winchester

Goal 4, Health: Provide opportunities and encouragement for the region's residents to walk, bicycle, skate, run, and gain the health benefits of incorporating physical activity into their daily lives.

Goal 5, Safety: Minimize the number of pedestrian and bicycle crashes and injuries while increasing the amount of pedestrian and bicycle activity in the region through improved facilities and education targeted at multiple users (motorists, bicyclists, and pedestrians).

Chapter 2: Existing Conditions for Walking and Bicycling in the Winchester-Frederick Region

The Winchester-Frederick region offers some opportunities for walking and bicycling for both recreation and transportation. Many area residents use non-motorized transportation modes to access local parks, schools, shops, and workplaces. Residents and visitors are attracted to historic downtown Winchester, which provides an excellent example of a high quality walking environment.

Lively pedestrian environment in downtown Winchester

However, there are also many barriers to pedestrian and bicycle access throughout the Winchester-Frederick region, including the absence of sidewalks and bicycle lanes on key roadways, disconnected street networks that force pedestrians and bicycles onto busy roads, and automobile-oriented developments.

Low density, single use development in the Winchester-Frederick area has created a deterrent to walking and bicycling due to long travel distances between origins and destinations. Housing communities are often isolated from services, workplaces and schools, and are divided by wide arterial streets that are uncomfortable for walking and bicycling. Many of the existing suburban areas in the region will require retrofit to accommodate and encourage walking and bicycling. Measures should be taken now to ensure that newly developed areas are designed to accommodate pedestrians and bicyclists.

Bicycling Conditions

High-speed, multi-lane roadway: bicyclists must share the lane with motor vehicles

On-road bicycling conditions in the region have a significant impact on riders' ability to get to and from their destinations. Multi-lane intersections, lack of shoulders or bicycle lanes, high speeds, and high traffic volumes all contribute to the perception that bicycling is unsafe on key routes in the region.

The area is home to a growing number of trails suitable for bicycling. The Green Circle Trail is currently under development in Winchester. A portion of the trail has already been built and is extremely popular.

Interstate 81 divides the community and creates a significant barrier to bicycling. Highway interchanges require bicyclists to share the road with high-speed traffic merging on and off highway ramps. Interchanges also present problems for pedestrian crossings.

Bicycle parking is not widespread. Many locations, such as commercial areas, schools, main streets, or public facilities, lack bicycle racks. Where bicycle racks are provided, they are sometimes hidden from view, or are not of a design that supports the frame of the bike (U-racks are preferred to "ladder style" or "wave" racks).

Existing "wave" bicycle rack in Sherando Park

Walking Conditions

Parts of the Winchester-Frederick area, such as downtown Winchester and the residential neighborhoods located nearby, are very welcoming to pedestrians. These areas have ample sidewalks and mature street trees. The pleasing walking environment draws high levels of pedestrian activity and creates a sense of place.

Existing footpath

In other areas, pedestrian facilities are deficient. Major roadways, such as the commercial areas along U.S. 522 and U.S. 11, lack continuous sidewalks and other pedestrian facilities. Along many of these routes, visible footpaths worn into the ground demonstrate existing pedestrian demand. Many roadways in the Winchester-Frederick region are wide and carry heavy traffic volumes, making it difficult for pedestrians to cross the street. Unmarked or faded crosswalks or signalized intersections without pedestrian signal heads sometimes compound the problem. Some existing sidewalks do not meet the Americans with Disabilities Act Accessibility Guidelines (ADAAG), due to intersections without curb ramps, driveways that cross sidewalks with excessive cross-slopes, utility poles that create barriers on sidewalks, or cracked or narrow sidewalks.

New developments within the Winchester-Frederick region vary in terms of their accommodation for pedestrians. Some have nice sidewalks on both sides of the street, but others lack sidewalks on one or both sides of the street. Some new residential developments lack a grass buffer zone between the sidewalk and the street, while others include a buffer zone planted with shade trees that provide an appealing pedestrian environment.

Many schools within the Winchester-Frederick region are surrounded by high-speed, multi-lane roadways without adequate pedestrian facilities. In many cases, students live close enough to walk to school if there were safe walking conditions.

Chapter 3: Facility Recommendations

This chapter recommends new and improved pedestrian and bicycle facilities in the Winchester-Frederick region. The facilities are intended to create an interconnected network of greenways, sidewalks, bikeways, and safe roadway crossings so that people have the safe and convenient option of bicycling and walking for transportation.

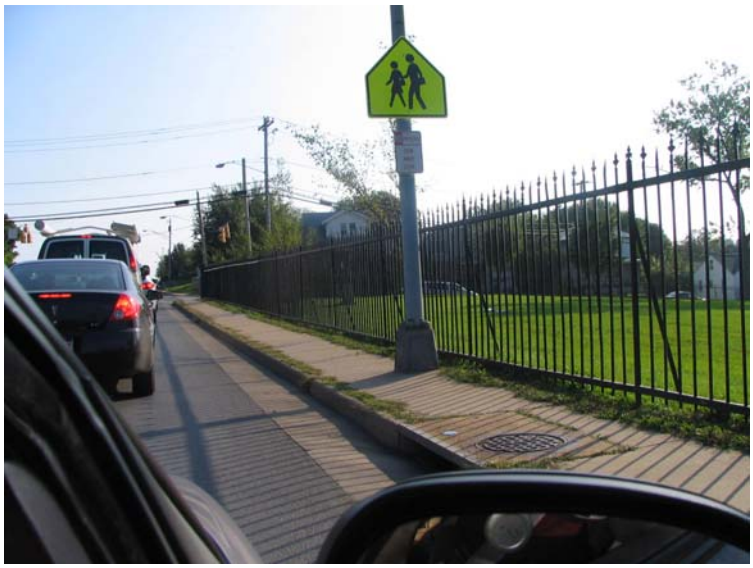
The recommended pedestrian and bicycle system consists of a variety of complementary facility types (e.g., shared-use paths, bicycle lanes, sidewalks, etc.). This system of facilities will be developed fully over the next 25 years. Specific locations for improvement and project phasing (short term, medium term, and long term) are identified in the Implementation chapter (Chapter 6).

ACTION 1: Provide facilities that allow pedestrians to travel along and across roadways safely.

The Win-Fred MPO, Frederick County, the City of Winchester, and the Town of Stephens City should work with VDOT to provide more sidewalks and safer roadway crossings that are accessible to all pedestrians. Nearly all local residents are pedestrians at some time during the day. People are pedestrians when they are walking to school, running on a sidewalk for exercise, crossing the street after parking in a downtown shopping district, or walking to a store entrance through a parking lot. Therefore, it is essential to provide safe, convenient, and accessible facilities for pedestrians.

Sidewalks

Sidewalks are recommended along both sides of the street for all roadways within the City of Winchester, the Town of Stephens City, and within Frederick County's Urban Development Area with the exception of roadways where pedestrians are prohibited. To achieve this goal, sidewalks should be included as part of new developments. There are numerous sidewalk gaps in previously-developed areas. In order to make the best use of limited funding, this plan identifies priorities for new and reconstructed sidewalks in order eliminate major gaps. These are the areas with the *greatest* need for sidewalks, but do not represent all of the locations where sidewalks are missing. In some cases, existing sidewalks are present, but are recommended for reconstruction because they do not meet ADA guidelines or because they are extremely narrow with no buffer between the sidewalk and adjacent traffic. See the Implementation Chapter (Chapter 6) for priority streets for sidewalk improvements.



Roadway crossing improvements

Roadway crossing improvements are recommended throughout the Winchester-Frederick region. Many pedestrian crashes occur at roadway crossing locations. Large roadways can be barriers to pedestrian travel because they are difficult to cross. See the Implementation Chapter (Chapter 6) of this plan for priority intersections for roadway crossing improvements.

ACTION 2: Develop on-road bicycle facilities to serve a wide variety of bicyclists.

Jurisdictions within the Winchester-Frederick area should work with VDOT to construct on-road bicycle facilities for all types of bicyclists. There are many different types of bicycle accommodations that can be provided on roadways,

including bicycle lanes, paved shoulders, and shared roadways. These facility types are appropriate in different situations. See Appendix A for a description of the different types of facilities.

The Implementation Chapter (Chapter 6) of this plan identifies specific roadways for new on-road bicycle facilities, such as bicycle lanes, paved shoulders, and shared roadways. The roadways are also shown on the Proposed Bicycle & Pedestrian Network map. The recommended projects will require additional evaluation during the implementation process to determine if there are other factors that may either help or hinder their development.

ACTION 3: Establish shared-use paths that serve the transportation and recreation needs of residents and visitors.

Shared-use paths are paved or unpaved trails that can serve a wide variety of types of non-motorized users, including bicyclists, runners, walkers, in-line skaters, and wheelchair users. Shared use paths should be a minimum of 10-feet wide and designed according to the *Virginia Bicycle Facility Design Guide* and the *AASHTO Guide for the Development of Bicycle Facilities* (1999).

The Proposed Bicycle & Pedestrian Network map shows a number of proposed shared-use paths, including the Winchester Green Circle near downtown Winchester and a major loop alongside the future Route 37 bypass route. These two pathways will serve as an inner and an outer loop and will provide major bicycle and pedestrian transportation and recreation opportunities throughout the area. Numerous other paths and on-road bicycle routes link these two loops.

The Proposed Bicycle & Pedestrian Network map also shows a number of smaller paths that will connect important destinations. Some of these trails have been proferred, that is, they will be provided by a developer as part of another development. Other paths are also under development, such as a series of trails suitable for mountain biking and walking on a 222- acre parcel of the Third Winchester Battlefield.

The Winchester-Frederick region should also continue to develop other less formal, unpaved trails that can be used for running, hiking, horseback riding, and mountain biking. These trails are not included on the recommendations map. Unpaved trails have the advantage of not adding impervious surface area to sensitive environmental areas. However, these trails are typically used for recreation rather than transportation.

Many of the other recommended shared-use paths can be provided through future land use development projects (i.e. proffers, roadway development, donations, and land purchase). As a result, the lines on the recommendations map representing long-term trails are very wide and generic in nature. They do not reflect the acquisition of specific properties. Instead, they represent important network connections that should be provided as land is developed.

ACTION 4: Install bicycle racks at key destinations throughout the Winchester-Frederick area.

Bicycle parking is essential in order to support bicycle travel. Bicycle racks should be installed at all parks throughout the area (they should be installed by the jurisdiction that owns the park). Bicycle racks should also be installed at other areas of high demand, such as downtown Winchester, public facilities, shopping areas, and park and ride lots.

ACTION 5: Improve pedestrian and bicycle access on bridges.

Federal law, as established in the Transportation Equity Act for the 21st Century (TEA-21), makes the following statements with respect to bridges:

Existing bridge with inadequate pedestrian and bicycle facilities

"In any case where a highway bridge deck is being replaced or rehabilitated with Federal financial participation, and bicyclists are permitted on facilities at or near each end of such bridge, and the safe accommodation of bicyclists can be provided at reasonable cost as part of such replacement or rehabilitation, then such bridge shall be so replaced or rehabilitated as to provide such safe accommodations." (23 U.S.C. Section 217)

Winchester-Frederick area governments should work with VDOT to ensure this federal transportation policy is implemented on all bridge construction and reconstruction projects.

Chapter 4: Policy Recommendations

By far, the most efficient way to improve conditions for walking and bicycling is to incorporate pedestrian and bicycle facilities into community design from the outset. It is much more expensive to retrofit pedestrian and bicycle facilities into communities that were originally designed only for automobile access.

New Suburban development in Winchester

The concept of "complete streets" has gained a tremendous amount of support in recent years through Federal, State, and local policies. Complete streets are those that are designed for all users – people who drive automobiles, people who use public transportation, people who bicycle, people with disabilities, and people who travel on foot. One of the keys to achieving this is for the MPO and its localities to ensure that the VDOT Policy for Integrating Bicycle and Pedestrian Accommodations is applied to all projects that involve VDOT right of way or utilize funds that flow through VDOT.

A critical step in providing convenient and safe options for pedestrian and bicycle transportation and recreation in the Winchester-Frederick region is to work to ensure supportive design guidelines, ordinances, and other regulations that steer community design and roadway construction (design guidelines are included in Appendix A, suggested changes to ordinances and other regulations are provided in Appendix B).

ACTION 6: Establish an institutional framework and oversight structure necessary to implement the recommendations of this Plan.

This recommendation addresses the need for continued oversight and coordination to ensure successful implementation of this Plan. This Plan serves as a starting point to provide direction for improving walking and bicycling conditions throughout the Winchester-Frederick region. The implementation

process that comes after this Plan is complete will require additional planning, coordination, design, and funding.

A variety of agencies, boards, committees and individuals will play a role in the oversight of future bicycle and pedestrian programs and projects. It is important that these entities provide the appropriate level of oversight and minimize overlap in their responsibilities. The responsibilities of each are described below:

County, Town, and City Agency Staff

County, Town, and City agency staff are responsible for implementing pedestrian and bicycle-related projects within their jurisdiction. They are also responsible for working with VDOT (where appropriate) on state roadway projects in order to accommodate bicycle and pedestrian facilities. Agency staff should work with developers to include bicycle and pedestrian improvements through the rezoning, subdivision, and site planning process. Local Building Officials also have responsibility under the International Building Code to ensure that accessible routes from site arrival points to accessible building entrances are also included.

City engineering inspection staff are also responsible for quality control of the system in the City. VDOT has this responsibility for public facilities within public street rights of way in the County and the Town. They must ensure that pedestrian and bicycle facilities are constructed and maintained in compliance with National, State, County, Town, and City standards. In this respect, they have a responsibility for inspecting pedestrian and bicycle facilities that are built by developers for public use.

Responsibility for on-street pedestrian and bicycle facilities: The implementation of the on-street pedestrian and bicycle facilities identified in this plan, such as sidewalks, bike lanes, and shared use paths adjacent to the roadway, is the responsibility of the entity with jurisdiction over the roadway. For state roadways, VDOT is the responsible entity. Local Planning Departments are responsible to work with VDOT to achieve the desired type of pedestrian and bicycle facilities on state roadways and to implement pedestrian and bicycle facilities on roadways under their own control.

Responsibility for off-street pedestrian and bicycle facilities: The off-street pedestrian and bicycle network identified in this plan will largely be built through the development process. Local governments will be responsible for filling gaps left after development is complete. Local governments may also choose to move forward with the development of additional trail projects that would be unlikely to occur as part of new development.

Pedestrian and Bicycle Program Liaisons

As indicated above, the responsibility for implementing this Plan will fall on agency staff. Therefore, it is recommended that one staff person from the City of Winchester and one staff person from Frederick County be assigned to oversee and coordinate the pedestrian and bicycle program. The positions would most likely be filled by someone from either the Planning Department or from the Parks and Recreation Department. In addition to the responsibilities outlined above for agency staff, these staff would be responsible for coordinating their efforts with adjacent jurisdictions and with pursuing grant funding.

Pedestrian and Bicycle Advisory Committee (PBAC)

A new ad hoc Pedestrian and Bicycle Advisory Committee (PBAC) should be formed to advise the Pedestrian and Bicycle Program Liaisons (see above), in order to provide support for the implementation of this Plan. This committee would not be a formal standing committee, rather it would develop recommendations that the Pedestrian and Bicycle Program Liaisons would bring to the MPO Technical Advisory Committee (TAC). The TAC would continue to be the formal venue through which pedestrian and bicycle facilities are addressed. Evidence from around the country shows that successful pedestrian and bicycle programs often result from well-organized advocacy and inter-agency support. The purpose of the PBAC will be to stimulate and coordinate the implementation of this Plan. The PBAC should be comprised of individuals from the Chamber of Commerce, City Planning and Zoning, County Planning and Development, Parks and Recreation, VDOT, representatives of organizations such as the Winchester Medical and Rehabilitation Centers, the Winchester Wheelmen, Physical Education departments in the school districts, and citizens from around the Winchester-Frederick area. A school system representative should also be considered for the Committee.

MPO Policy Committee

The MPO Policy Committee makes the official decisions of the MPO. The Policy Committee will be responsible for the consideration of pedestrian and bicycle needs in the Transportation Improvement Program (TIP) and other plans and programs as necessary. They should continue to work to ensure that local transportation decisions are balanced and consider all users.

MPO Technical Advisory Committee

The Technical Advisory Committee reviews and makes recommendations to the Policy Committee on all plans and programs to be adopted, conducts special studies at the request of the Policy Committee, and generally provides expert transportation advice to the Policy Committee. As mentioned previously, the Technical Advisory Committee would continue to be the formal venue through which pedestrian and bicycle project priorities are addressed within the MPO.

ACTION 7: Ensure that the non-motorized transportation and recreation facilities identified in this Plan (and other local plans) are constructed during development projects.

County, City, and Town staff should require future developers to construct the pedestrian, and bicycle facilities that are identified in this Plan as a part of their developments. Over time, this will help address the Winchester-Frederick region's current problem of disconnected sidewalks and bikeways.

In addition, new development often creates new opportunities for providing non-motorized transportation and recreation facilities. Therefore, developers should also be required to include other public pedestrian and bicycle facilities to provide both internal and external connectivity.

ACTION 8: Incorporate new pedestrian and bicycle facility design standards into relevant ordinances. Require that developer-provided pedestrian and bicycle accommodations meet the new design standards.

Town, City, and County ordinances should be amended to include more specific standards for the design of pedestrian and bicycle facilities. The standards should include requirements for appropriate facility dimensions, surface, cross-slope, location, etc. Developers that have worked in other Virginia localities are accustomed to regulations governing the bicycle and pedestrian facilities within their developments. Appendix A of this Plan provides Bicycle and Pedestrian Facility Design Guidelines that can be incorporated into the ordinances.

Generally, bicycles and pedestrians should be considered during the revision of all local plans and ordinances. Local plans and ordinances, including the Comprehensive Plans, Zoning Ordinances, and Subdivision Ordinances, have been examined with regard to policies that encourage pedestrian and bicycle

access. Appendix B provides recommendations for how these plans and ordinances could be strengthened.

ACTION 9: Develop a maintenance and management program that ensures that facilities are maintained in good repair, both through routine seasonal maintenance and spot repairs.

Since the pedestrian and bicycle facilities proposed in this Plan will be owned by various jurisdictions and entities, ensuring good maintenance will require coordination with a variety of parties. This includes VDOT, the City of Winchester, Frederick County, developers and property managers, Home Owners Associations (HOAs), volunteer groups, and other organizations. VDOT will maintain (e.g., replace and repair) "sidewalks, shared use paths, and bicycle paths built within department right-of-way, built to department standards, and accepted for maintenance" (as per VDOT Policy for Integrating Bicycle and Pedestrian Accommodations, effective March 18, 2004). This does not include snow and ice removal on sidewalks and shared-use paths and does not preclude previous maintenance agreements.

Maintenance Schedule

A first step in developing a maintenance program is to identify what tasks need to be undertaken and who is responsible for these tasks. Responsibility is largely determined by facility ownership. Tasks are largely divided between on-street bikeway maintenance tasks, "off-street" sidewalk tasks, and multi-use trail maintenance tasks. Recommended maintenance practices include:

- Sweeping trails, bicycle lanes and paved shoulders regularly to remove debris;
- Repairing trail and roadway surfaces and

Downtown Winchester, VA

sidewalks to ensure a continuous facility and smooth surface that is free of cracks, potholes, bumps and other physical problems;
- Repair of utility cuts to prevent rough surfaces for cyclists and sidewalk interruptions for pedestrians;
- Cutting back vegetation such as shrubbery, tree limbs and intrusive tree roots to prevent encroachment;
- Maintenance of pedestrian and bicycle signs, striping, and markings, especially replacement of signs that are damaged by vehicle crashes and other incidents;
- Maintenance of drainage facilities including catch basins and drainage grates;
- Snow removal; and
- Signal maintenance.

Maintenance Website and Hotline

Once a regular schedule for pedestrian and bicycle facility maintenance is established, a website and phone hotline should be established to allow residents to report maintenance problems and request spot repairs. City and County should update their websites to include a "Pedestrian and Bicycle Facility Maintenance Action Request Form" and should establish a Pedestrian and Bicycle Maintenance Hotline to give citizens an easy means of reporting maintenance concerns on local trails and bikeways. The City and County should then forward maintenance concerns to the appropriate jurisdiction as appropriate.

Maintenance Manager

In the future, as there is need, the County should identify a lead staff person as a Maintenance Manager to organize and keep track of both regular and remedial inspection and maintenance of the pedestrian and bicycle network. This staff person would be responsible for coordinating with VDOT, County maintenance crews, and volunteer groups for tasks that they can assist with. The maintenance manager would be responsible for addressing maintenance issues that were raised by residents through the County or City website or Pedestrian and Bicycle Facility Maintenance Hotline.

ACTION 10: Provide opportunities for periodic regional training and professional development related to pedestrian and bicycle planning and design skills.

The Win-Fred MPO should partner with VDOT to provide training to staff from Frederick County, the City of Winchester, the Town of Stephens City, as well as consultants, policy makers, Commissioners and others on pedestrian and bicycle issues. This training will help those who are responsible for development reviews and for coordinating with VDOT on transportation projects to understand the requirements for pedestrian and bicycle accommodation. Providing training on how to incorporate pedestrian and bicycle needs into the planning, design, construction, and maintenance phases of roadway and land development processes is supported by the VDOT Policy for Integrating Bicycle and Pedestrian Accommodations. Other professional development activities are also recommended for the Pedestrian and Bicycle Program Liaisons. Examples are attendance at Pedestrian and Bicycle related conferences and membership in the Association of Pedestrian and Bicycle Professionals (APBP). APBP membership and conference attendance provide valuable technical advice on the planning and design of pedestrian and bicycle accommodations.

ACTION 11: Pursue additional grant sources and capital funding as necessary to supplement developer-financed pedestrian and bicycle facilities.

Although parts of the proposed network will be built through the development process, there are sizable gaps in already-developed areas of the pedestrian and bicycle network that will likely not be addressed unless funding is secured for these projects. It will be important to establish a mechanism by which to build these connections, otherwise the network will remain incomplete. There are a wide variety of grant sources available (see Implementation Chapter, Chapter 6). The County and City should also establish a yearly capital budget item for new pedestrian and bicycle facilities in order to provide matching funds for future successful grants, and to complete special projects that are not grant-funded.

ACTION 12: Initiate a "Trend-setter" Policy in the Town, City, and County.

The Town, City, and County can serve as model employers by incorporating best practices for pedestrian and bicycle into their facilities and policies. This will help encourage others to follow their example. For instance, Town, City, and County buildings would provide bicycle racks that meet the guidelines provided in Appendix A of this Plan.

ACTION 13: Complete an ADA Transition Plan for the Public Right of Way

The Town, City, and County should complete an Americans with Disabilities Act (ADA) transition plan for the elements of the public right of way. A transition plan creates a methodology for identifying, prioritizing, and removing barriers to ADA accessibility. For example, an ADA transition plan for the Public Right of Way might inventory locations of missing curb ramps and prioritize ramp installation projects on a yearly basis.

Chapter 5: Program Recommendations

In addition to the facility recommendations presented in Chapter 3 and the policy recommendations in Chapter 4, a complete approach to improving conditions for pedestrians and bicycles includes recommendations for new education, enforcement, and encouragement programs. Pedestrians and bicyclists of all skill levels should be educated on how to use new pedestrian and bicycle facilities safely. Drivers should also be educated to treat pedestrians and bicyclists as legitimate users of the road and to operate safely around these non-motorized modes. Unsafe behavior by motorists, pedestrians and bicyclists should be targeted through law enforcement. At the same time, promotional efforts, such as Walk and Bike to School Day and developing a public walking and bicycling map can help advertise walking and bicycling fun, healthy forms of recreation and transportation in the Winchester-Frederick area.

This section presents a number of recommendations that will promote and increase the safety of walking and bicycling.

ACTION 14: Educate local residents about pedestrian and bicycle safety.

Unify and Strengthen Existing Education Programs
Annual or biannual coordination meetings should be held in order to plan and coordinate the various local events that relate to walking and bicycling, such as Valley Health's Community Wellness Festival and the Winchester Green Circle Fall Fitness Fair (which includes a 5K run, a one mile kids run, a bike safety rodeo, helmet fittings, give-a-ways, and interpretive walks in the Abrams Creek Wetlands Preserve). Linking these programs under a broader umbrella would make each program more effective. The meetings would serve to allow the groups to coordinate on event dates and themes and would allow the groups to combine resources. Current partners for the Fall Fitness Fair include the Opequon Watershed, Inc., the Winchester Wheelmen, Shenendoah Valley Runners, Winchester Parks and Recreation, and the Winchester Medical Center. Additional groups could be invited to the meetings, such as the Red Cross and the police.

Bicycling and Walking Rodeos
Bicycle rodeos have been held in the past as part of the Green Circle Fall Fitness Fair and they should continue to be held several times a year. The City and County Parks and Recreation Departments should work with the Frederick

County Sheriff's Office, the Winchester Police Department, the Red Cross, Valley Health, the Winchester Green Circle, The Winchester Wheelmen, and other local organizations to organize walking and bicycling rodeos. These rodeos provide an opportunity for local residents to be taught safe bicycling and walking skills and give children hands-on experience to improve their skills. The rodeo can be set up with mock streets, intersections, and houses/stores for the walking course and cones, stop signs and play vehicles for the bicycle course. These rodeos should continue to be coordinated with other events such as the Green Circle Fall Fitness Fair, the Community Wellness Festival, running or bicycling races, and community bicycle rides.

Safety City
The Pedestrian and Bicycle Program Liaisons could apply for grant funding to install and run a permanent "Safety City" program. Safety City is a miniature city of streets, signs, and traffic signals where children can be taught safe walking and bicycling skills. Safety City is effective because it is a fun and memorable way for children to learn.

Pedestrian and Bicycle Safety Education Curriculum in Schools
The Pedestrian and Bicycle Program Liaisons should work with the Winchester and Frederick Public Schools to implement a pedestrian and bicycle safety education curriculum in elementary and middle schools throughout the area. Educational programs offered by other entities (for example, Parks and Recreation departments and Valley Health) should also be modified to add pedestrian and bicycle safety material.

There are a number of existing sources for funding and assistance in integrating pedestrian and bicycle safety education into schools such as the "Bike Smart, Virginia" program and the Department of Motor Vehicle's Safety Grant. The "Bike Smart, Virginia!" initiative is a collaborative project with the Virginia Departments of Education, Health, Motor Vehicles, and Transportation and the non-profit organization, BikeWalk Virginia. The program aims to prevent bicycle-related injuries and fatalities in communities throughout Virginia. The initiative has several components to educate citizens about bicycle safety and to make safety equipment (such as bicycle helmets) available.

The "Bike Smart, Virginia!" program offers training-the-trainer workshops around the state throughout the year. At these workshops, school health and PE teachers receive 2 days of training in methods of teaching bicycle safety and become "Bike Smart Basics" Certified. These trainers can then offer the "BikeSmart, Virginia!" six-week course as a part of the Health and Physical Education curriculum in elementary and middle schools. The course includes on-bike instruction (including: helmet safety, crash avoidance, bike handling

skills, rules of the road, etc.) and other safety tips. Additional information can be found at www.vahealth.org/civp/bike/schools.asp. The City and County should work with the health and P.E. coordinator for the school systems to conduct additional research into the program and gain the involvement of local schools.

Another viable source for pedestrian and bicycle safety education funding in Virginia is the Department of Motor Vehicle's Safety Grant. The Virginia DMV accepts grant applications each year in March that support Virginia's primary transportation safety goal of "reducing the number of deaths and serious injuries that result from traffic crashes," which includes improving pedestrian and bicycle safety. Guidelines for the current year's application can be found at http://www.dmv.state.va.us/webdoc/general/safety/index.asp.

Bicycle Safety Education for Adults
The MPO should work with the Winchester Wheelmen to sponsor and promote adult cycling classes offered by the Virginia Bicycle Federation (VBF). The VBF offers several different types of courses, including Bicycling 101; Bicycle Maintenance and Repair; Bicycle Mechanics Workshop; Cycling with Confidence; and Bike Commuting, Bike Touring, and All-weather Cycling.

Pedestrian and Bicycle Awareness Campaign
The MPO should investigate partnering with the metropolitan Washington Council of Governments on the Street Smart Pedestrian and Bicycle Safety Public Awareness Campaign. This campaign uses a combination of media advertising, increased law enforcement, and educational materials to educate the public about the severity of pedestrian and bicycle safety issues and increases awareness of pedestrian and bicycle safety laws. The focus of the campaign is different each year, so the MPO should ensure that the message will be relevant to the Winchester-Frederick region.

ACTION 15: Conduct programs and events that encourage walking and bicycling for fun, health and fitness, and for transportation.

Community-wide encouragement and advocacy for bicycling and walking can be achieved through events, ongoing programs, and city or county sponsored initiatives. An important key to success is having a coordinated approach, a consistent message, and focused activities. Recommended encouragement activities are listed below.

Media Outreach and Website
The Pedestrian and Bicycle Advisory Committee (PBAC) should develop a media outreach plan to promote the Plan and to educate various constituencies throughout the region. This could include the development of a short fact sheet for promoting the plan or a website to encourage walking and bicycling in the Winchester-Frederick area. The website could include maps of on and off road walking and bicycling facilities and recommended touring routes that provide access to battlefields and other historic and cultural sites. Information could also be provided on pedestrian, bicycle, and driver safety tips. It could also include resources such as bicycle shops, running shoe stores, bicycle clubs, a calendar of events with information about organized rides and walking tours, and links to other websites with information about walking, bicycling, and health.

Bicycling and Walking Maps
The Win-Fred MPO, the Tourism Board, the Convention and Visitors Bureau and/or local agencies should partner with the Chamber of Commerce develop maps of walking and bicycling routes. The non-profit organization "Preservation of Historic Winchester" has already developed two different self-guided walking tours of Winchester. The group distributes brochures showing route maps and historical information. The group also provides guided walking tours. Additional walking and bicycle tour maps should be developed. These brochures would show the bicycle route or walking route in significant detail, including written directions (e.g., cue sheet). They would include information about battlefields and other historic sites, restaurants, shops, and other attractions along or close to the route. This type of brochure would be a great resource for residents or visitors looking to do a half-day or full-day of walking or bicycling in the Winchester-Frederick region.

Community Events
The Pedestrian and Bicycle Program Liaisons should work with the PBAC, the Winchester Wheelmen, the Winchester Green Circle and local volunteer groups to sponsor regular rides and events in the Winchester-Frederick area. Events could include community bike rides for children, family bicycle tours, walk-a-thons, community trail walks, interactive historic walking tours, and guide walking and cycling tours for elected officials.

Employee Pedestrian and Bicycle Commute Incentives Programs
The City of Winchester and Frederick County should encourage pedestrian and bicycle commuting by providing information about economic benefits, health benefits, and potential commuting routes to employers and employees.

Public agencies within the MPO should be model employers by considering the following actions:

- Offering monetary incentives for employees who walk, bicycle, or take transit to work
- Providing showers and lockers for employees
- Establishing "Guaranteed Ride Home" policies for people who do not bring a car to work but need a car in case of emergencies and inclement weather.
- Encouraging employees who live in locations that are safe and convenient for walking and bicycling to work to participate in Walk- and Bike-to-Work Day.

Walk and Bicycle to School Day
The Pedestrian and Bicycle Program Liaisons should work with local schools to increase participation in International Walk and Bicycle to School Day (held each year in October). Walk to school days have been instituted at many of schools throughout Virginia over the past decade. They increase awareness of bicycling and walking as fun, healthy transportation choices that can reduce automobile congestion and pollution near schools.

ACTION 16: Start community-based advocacy programs.

The Winchester Wheelmen and the Shenandoah Valley Runners can take the lead in developing a community-wide advocacy program. Through activities such as distributing pedestrian and bicycle safety information and developing route maps, the groups can help promote bicycling and walking.

ACTION 17: Improve enforcement of laws concerning the safe interaction of pedestrians, bicyclists, and motorists in shared environments.

Crosswalk Enforcement Program
Educate law enforcement officers about how to conduct a crosswalk enforcement program. The crosswalk enforcement program should focus on the following:

- Motorist not yielding to pedestrians in crosswalks
- Motorist speeding
- Motorist running red lights
- Unsafe pedestrian and bicycle behaviors

Conduct a Safety Awareness Week
Law Enforcement officers should conduct a "Focus on Pedestrians" safety campaign. For example, the Laurel, MD Police Department holds an annual Pedestrian Safety Awareness Week in Laurel's downtown each year. Each day,

they focus on a different theme, culminating in a Safety Saturday event aimed at raising general awareness of pedestrian issues. Weeklong activities include speed trailers on Main Street, targeted enforcement (drivers who do not yield to pedestrians at crosswalks are ticketed), and safety awareness messages.

Involve Law Enforcement in SRTS Activities
Law enforcement officers with the City and County should actively participate in Safe Routes to School (SRTS) programs. Officers can help enforce traffic laws near schools, provide speed trailers, and evaluate local traffic concerns.

ACTION 18: Seek funding to initiate a Safe Routes to School Program

The Pedestrian and Bicycle Program Liaisons should work with local schools to apply to VDOT for Federal grant funding to establish a SRTS pilot program at local schools. This grant source provides 100% (no match required) funding for engineering, education, enforcement and encouragement programs within 2 miles of schools that serve Kindergarten though the 8th grade. The program could be based on existing models used in Charlottesville and elsewhere to plan physical improvements (including sidewalk construction and pedestrian crossing improvements) and implement safety education programs at interested schools.

Safe Routes to School programs are beneficial because they provide an impetus to improve walking conditions around schools, help to reduce the financial burden of student busing, provide another way for children to get daily exercise, and reduce traffic volumes during the morning peak hours. State and national estimates suggest that up to thirty percent of morning peak hour vehicle trips are school-bound trips or include dropping students at schools. The environmental, social, health, and safety (not to mention direct costs) of a system that delivers most students to school via school buses and personal automobiles is significant. While increasing the numbers of students that bicycle and walk to school can help mitigate the negative impacts of the current system, safe routes to school must be created before parents and school officials will feel comfortable encouraging students to use them.

It is likely that SRTS programs will be most successful in schools located within the more urban and suburban areas of the Winchester-Frederick region. However, health-based SRTS programs have also been successfully implemented in rural areas of Virginia by using walking routes on the school campus.

ACTION 19: Develop and Support local programs to build and maintain new pedestrian and bicycle facilities, such as an "Adopt-a-Trail" program.

In order to support pedestrian and bicycle facilities, the City of Winchester and Frederick County could develop an "Adopt-a-Trail" program. Kiosks or signs would provide recognition to local businesses that sponsor the development and/or beautification of pedestrian and bicycle facilities. This program would supplement, rather than replace, existing maintenance programs.

ACTION 20: Launch a corridors-to-campus initiative to support walking and biking to Shenandoah University.

Working with University officials, the PBAC should launch a corridors-to-campus initiative designed to identify, evaluate, and prioritize the most cost effective strategies to support walking and bicycling to and from Shenandoah University and between the campus locations. Connections between campus and downtown should be included. As an example, the University of Florida, in cooperation with the City of Gainesville, conducted such and effort in 1998 as part of an overall mobility management effort. The study entailed intercept questionnaires and ranking of routes from surrounding neighborhoods and apartment complexes that would benefit from specific bicycle and pedestrian improvements. The results were programmed into the MPO's Transportation Improvement Program as well as University capital investment and program budgets.

Chapter 6: Implementation Plan

This chapter describes how the recommendations for improving the safety and convenience of pedestrian and bicycle transportation and recreation in the Winchester-Frederick area will be achieved over the next 25 years. The first section of this chapter breaks the phasing of recommendations into short-, medium-, and long term categories. The second part of the chapter discusses the groups and organizations that will be responsible for implementing recommended projects and programs. The final section describes potential funding sources for the Plan.

Project and Program Phasing

The projects and programs recommended in this Plan will be implemented over the next 25 years. Phasing of the plan recommendations is discussed below. Specific short term recommendations are listed. These are the first actions that should be taken to begin implementing this Plan. Refer to Chapters 5 and 6 for more detailed descriptions of facilities and programs.

Short Term Recommendations (0 to 5 years)

Several key projects and programs should be implemented soon after this Plan is adopted (within 5 years). These short term projects will improve pedestrian and bicycle conditions in specific areas, creating early successes which can be used to expand public support for future projects. These short term projects, programs, and policies will build momentum for the other recommendations of the plan.

For short term recommendations, preliminary cost estimates were developed. The construction cost estimates were developed by identifying pay items and establishing rough per-mile quantities. Unit costs are based on 2007 dollars and were assigned based on historical cost data from the Virginia Department of Transportation and other sources. Because this is a planning level analysis, the costs shown only reflect cost associated with construction of the particular bicycle or pedestrian facility indicated, and do not reflect other costs that may be associated with a larger project. The costs are intended to be general and used for long-range planning purposes. A 25% contingency is applied to the cost for each item. The construction estimates **do not** include costs for planning, surveying, engineering design, right-of-way acquisition, mobilization, maintenance of traffic during construction, landscaping/aesthetics, utility adjustments, lighting, drainage, stormwater management, erosion and sediment control, significant grading, bridges, retaining walls, significant changes in

vehicular traffic patterns, or future maintenance. Construction costs will vary based on the ultimate project scope (i.e. combination with other projects) and economic conditions at the time of construction.

Short Term Sidewalk Installation and Reconstruction (including ADA improvements)

The following table identifies priorities for sidewalk improvement, reconstruction, and ADA improvements in the short term. Each location identified for short term sidewalk installation and rehabilitation will require further study to determine the scope of the necessary improvement. This should happen as part of the design process. The short term improvements identified represent an aggressive schedule for improvements. Improvements or portions of improvements that cannot be completed in the short term may become longer-term projects. Opportunities may arise to construct these improvements (or other improvements not listed below) as part of other roadway projects, presenting the opportunity to install new sidewalks, complete ADA improvements, or rehabilitate existing sidewalks at a **greatly** reduced cost.

Short Term Sidewalk Installation, Reconstruction, and ADA Improvements

Street Name	From	To	Improvement	Length	Est. Cost*
City of Winchester					
E. Cork Street	City of Winchester Eastern Border	Purcell Ave/Maple Dr	New sidewalk or bike/walk path along City Park frontage on S. side	0.3	$54,000
	Purcell Ave/Maple Dr	S. Pleasant Valley Road	Reconstruct/widen sidewalks. Provide ADA improvements on both sides	0.1	$35,000
	S. Pleasant Valley Road	S. East Lane	New sidewalk on N. side and ADA improvements on S. side	0.4	$74,000
Valley Avenue, Rt. 11	W. Gerrard Street	Bellview Ave	Replace sections damaged by tree roots and provide ADA improvements for walks on both sides	0.7	$7,000
	Bellview Ave	Middle Road	Reconstruct/provide ADA improvements for walks on both sides. New walk in front of 2011 Valley Ave	0.8	$280,000
	Middle Road	City of Winchester Border	Infill new sidewalks on both sides	1.4	$336,600
Middle Road	Valley Ave	Crestview Terrace	Install new sidewalk on both sides	2.4	$840,000
	Crestview Terrace	Nazarene Drive	New sidewalk on east side. Infill missing sidewalk segments on W. side.	0.4	$132,000
	Nazarene Drive	City of Winchester Border	Install sidewalk on west side. Install missing segment of sidewalk or bike/walk path on E. side.	0.2	$38,000
Cedar Creek Grade	Valley Avenue	City of Winchester Border	Provide ADA and maintenance improvements for sidewalks on both sides (reconstruct and widen portions near tree wells if necessary)	1.5	$15,000
Pleasant Valley Road	Papermill Road	Berryville Avenue	Reconstruct/provide ADA improvements for existing sidewalks on both sides	2.9	$870,000
E. Jubal Early Drive	S. Loudoun Street	Millwood Avenue	Provide ADA and maintenance improvements for existing walks on both sides	0.7	$7,000
Amherst Street	N. Braddock Street	Entrance to Museum of Shenandoah Valley	Provide ADA and maintenance improvements for sidewalks on both sides (reconstruct portions if necessary)	0.6	$30,000
	Entrance to Museum of Shenandoah Valley	City of Winchester Border	Install new sidewalk and/or bike/walk path on S. side. Infill missing walk on N. side.	1.2	$312,000
S. Loudoun Street	Jubal Early Drive	Weems Lane	Install new sidewalks on both sides as part of VDOT project	0.4	N/A
	Piccadilly St	North Ave	Reconstruct sidewalks on both sides	0.3	$105,000
	Cork St	Gerrard St	Reconstruct sidewalks on both sides	0.4	$140,000
S. Kent St	E. Cork St	Millwood Avenue	Reconstruct sidewalks on both sides	0.4	$140,000
Woodstock Lane	N. East Lane	N. Pleasant Valley Rd	Infill new sidewalk on N. side	0.3	$54,000
National Ave	N. East Lane	N. Pleasant Valley Rd	Reconstruct sidewalks on both sides	0.4	$140,000
Town of Stephens City					
Main Street, Rt. 11	Town of Stephens City Northern Border	Barley Drive	Install new sidewalks on both sides of road	0.6	$210,000
	Barley Drive	Newtown Court	Install new sidewalk on E. side of road	0.5	$90,000
	Newtown Court	Stephens Run Street	Reconstruct/provide ADA improvements for existing sidewalks on both sides of the road	0.6	$196,000
Frederick County (within WinFred MPO)					
Senseny Road	Greenwood Road	City of Winchester Line/E. Cork Street	Install new sidewalks on both sides of road	1.6	$560,000
Front Royal Pike, Rt. 522	Millwood Pike, Rt. 50	Clarke County Line	Install new sidewalks on both sides of road	7.0	$2,450,000
Valley Pike, Rt. 11	City of Winchester Southern Border	Musket Drive	Install new sidewalks on both sides of road	2.6	$910,000
Middle Road	City of Winchester Western Border	Powder Horn Lane	Install new sidewalks on both sides of road	1.2	$420,000
Cedar Creek Grade	City of Winchester Western Border	Rt. 37	Install new sidewalks on both sides of road	0.9	$315,000
Greenwood Road	Berryville Pike	Edmonson Lane	Install new sidewalks on both sides of road	2.1	$745,500

***Note: Cost estimates are provided for planning purposes only. These estimates assume that each project would be independently funded. However, due to the more common practice of incorporating bicycle and pedestrian facilities into larger street construction projects, as well as the involvement of private developers in constructing these facilities in many locations, the costs shown above are in many cases much higher than the actual cost of implementing projects.**

Short Term Bicycle Facilities

The locations in the following tables have been identified for on-street bicycle facilities in the short term. Additional traffic analysis will be needed in some cases to determine the optimum design for specific locations. Some locations may be determined, after more detailed analysis, to require different or more costly improvements and therefore may become longer-term projects. Additional opportunities not shown on the map may also arise during repaving and other roadway projects, presenting the opportunity to reallocate roadway space for bicycles. Costs shown in this section may be **greatly** reduced by incorporating new bicycle facilities into roadway resurfacing and rehabilitation projects as an improvement incidental to the larger project.

Short Term Bicycle Facilities

Street Name	From	To	Improvement	Length (miles)	Est. Cost*
City of Winchester					
Valley Avenue, Rt. 11	S. Braddock Street	City of Winchester Southern Border	Bike Lanes	2.6	$79,200
S. Loudoun Street	Jubal Early Drive	Weems Lane	Bike Lanes	0.6	$18,900
Papermill Road	Weems Lane	S. Pleasant Valley Road	Bike Lanes	0.6	$18,600
Papermill Road	S. Pleasant Valley Road	City of Winchester Eastern Border	Bike Lanes	0.6	$18,600
Pleasant Valley Road	Berryville Ave	Papermill Road	Bike Lanes	2.9	$85,500
Cork Street	City of Winchester Eastern Border	S. Washington Street	Bike Lanes	1.3	$38,100
Amherst Street	City of Winchester Western Border	W. Boscawen Street	Bike Lanes	1.4	$42,000
W. Boscawen Street	Amherst Street	N. Washington Street	Bike Lanes	0.3	$7,500
Cedar Creek Grade	City of Winchester Western Border	Valley Ave	Bike Lanes	0.5	$15,900
Jubal Early Drive	S. Pleasant Valley Road	Meadow Branch Ave	Bike Lanes	1.4	$42,600
Jubal Early Drive	Valley Ave	Meadow Branch Ave	Add Missing Segments to Existing Shared Use Path	0.7	$110,000
Middle Road	Valley Ave	City of Winchester Western Border	Bike Lanes and/or add Missing Segments to Existing Shared Use Path	1.0	Bike Lanes: $30,000; Missing Segments Shared Use Path: $255,000
Campus Boulevard	Amherst Street	Winchester Medical Center/Wellness Center	Bike Lanes	0.7	$20,400
Town of Stephens City					
Main Street, Rt. 11	Town of Stephens City Northern Border	Town of Stephens City Southern Border	Bike Lanes	1.8	$52,500
Fairfax Street	Main Street	Town of Stephens City Eastern Border	Bike Lanes	0.1	$4,200

***Note: Cost estimates are provided for planning purposes only. These estimates assume that each project would be independently funded. However, due to the more common practice of incorporating bicycle and pedestrian facilities into larger street construction projects, as well as the involvement of private developers in constructing these facilities in many locations, the costs shown above are in many cases much higher than the actual cost of implementing the projects.**

Short Term Bicycle Facilities, Continued

Street Name	From	To	Improvement	Length (miles)	Est. Cost*
Frederick County (within WinFred MPO)					
Valley Pike, Rt. 11	City of Winchester Southern Border	Town of Stephens City Northern Border	Bike Lanes	2.9	$86,100
Valley Pike, Rt. 11	Town of Stephens City Southern Border	MPO Southern Border	Bike Lanes	1.5	$43,500
Front Royal Pike (522)	Millwood Pike, Rt. 50	Clarke County Western Border	Bike Lanes	7.1	$212,400
Front Royal Pike (522)	Proposed Trail north of Clydesdale Drive	Tasker Road	Shared Use Path	1.5	$46,200
Senseny Road	City of Winchester Eastern Border	Clarke County Western Border	Bike Lanes	3.7	$110,438
Cedar Creek Grade	City of Winchester Western Border	Rt. 37	Bike Lanes	1.0	$30,900
Cedar Creek Grade	Proposed Trail near Winchester Western Border	Proposed Trail to the east of Rt. 37	Shared Use Path	0.6	$197,200
Middle Road	City of Winchester Western Border	MPO Western Border	Bike Lanes	1.8	$52,500
Apple Valley Road	Middle Road	Valley Pike	Bike Lanes	1.2	$36,898
Greenwood Road	Berryville Pike, Rt. 7	Sulphur Spring Road	Bike Lanes	3.0	$89,880
Northwestern Pike, Rt. 50	City of Winchester Western Border	Round Hill Road	Shared Use Path	0.7	$238,000
Northwestern Pike, Rt. 50	Round Hill Road	MPO Western Border	Bike Lanes	3.9	$117,000
Frederick Pike (Route 522)	City of Winchester Northern Border	Indian Hollow Road	Shared Use Path	2.1	$720,800
Frederick Pike (Route 522)	Indian Hollow Road	MPO Western Border	Bike Lanes	1.7	$49,500
Valley Mill Road	Berryville Pike, Rt. 7	Berryville Pike, Rt. 7	Bike Lanes	3.0	$91,320
Valley Mill Road	Greenwood Road	Proposed Trail near the Rt. 37 extension	Shared Use Path	1.9	$646,000
Airport Road	Front Royal Pike, Rt. 522	Millwood Pike, Rt. 50	Bike Lanes	3.8	$113,100
Victory Road	Millwood Pike	Airport Road	Bike Lanes	0.8	$22,500
Independence Road	Victory Road	Millwood Pike, Rt. 50	Bike Lanes	0.5	$15,472
Tasker Road	Route 37	Front Royal Pike, Rt. 522	Bike Lanes	4.6	$136,875
Aylor Road	Tasker Road	Fairfax Pike	Share Use Path	2.1	$709,920
Fairfax Pike	Town of Stephens City Eastern Border	Clarke County Western Border	Bike Lanes	4.5	$136,170
Sherando Lane	Sherando Park	Double Church Road	Bike Lanes	0.7	$22,287
Apple Pie Ridge Road	Frederick Pike, Rt. 522	Hiatt Road	Bike Lanes	3.8	$114,321
Warrior Drive	Sherando High School (South of Fairfax Pike)	Craig Drive (Connect to Proposed Trail to the North)	Bike Lanes	1.9	$56,100
Papermill Road	City of Winchester Eastern Border	Front Royal Pike, Rt. 522	Bike Lanes	1.3	$40,200

***Note: Cost estimates are provided for planning purposes only. These estimates assume that each project would be independently funded. However, due to the more common practice of incorporating bicycle and pedestrian facilities into larger street construction projects, as well as the involvement of private developers in constructing these facilities in many locations, the costs shown above are in many cases much higher than the actual cost of implementing projects.**

Short Term Shared-Use Paths

The Winchester Green Circle Trail is currently under development. This is a high-priority project and as much of the trail as possible should be completed in the next five years.

In the short term, most of the proposed shared use paths shown on the Proposed Bicycle & Pedestrian Network Map should be constructed as part of the

development process. Local governments should also begin securing capital budget items for future use as matches for Transportation Enhancement grants. In the medium term, missing trail segments should be identified and this funding can be used to pursue the development of these missing links and new trail construction projects, such as the Rt. 37 Loop Trail.

Short Term Roadway Crossing Improvements (Including ADA Improvements)

The locations identified below should be prioritized for roadway crossing improvements. Roadway crossing improvements include ADA curb ramps, pedestrian countdown signals, raised medians, and other improvements (as recommended in Appendix A of this plan) to improve the safety of pedestrians and bicyclists crossing the roadway.

City of Winchester:

- S. Pleasant Valley Road and E Cork Street
- E. Cork Street and N. Purcell Ave
- S. Pleasant Valley Road and Lowry Drive/Hollingsworth Drive
- S. Pleasant Valley Road and E. Jubal Early Drive
- Apple Blossom Drive and E. Jubal Early Drive
- Jubal Early Drive and S. Loudoun Street
- W. Jubal Early Drive and Valley Avenue
- Millwood Avenue at Shenandoah University (Frontage Road)
- W. Piccadilly Street and N. Braddock Street
- Amherst Street and W. Boscawen Street
- Amherst Street and Whittier Avenue
- Amherst Street and Meadow Branch Avenue

Frederick County (Within the WinFred MPO):

- Berryville Pike at Eastern border of Frederick County
- Berryville Pike and Interstate 81
- Papermill Road at Interstate 81
- Millwood Pike and Inverlee Way
- Northwestern Pike, Rt. 50 near Rt. 37
- Rt. 37 and Frederick Pike (522)
- Rt. 37 near Winchester Medical Center
- Apple Pie Ridge Road and Frederick Pike
- Middle Road and Rt. 37
- Cedar Creek Grade and Rt. 37

Short Term Policies

The policies identified below are meant to serve as the first step to ensuring that local design guidelines, ordinances, regulations, and other policies are supportive of including facilities for pedestrians and bicycles.

- *Development Review*: The Town, City, County, and VDOT should continue to ensure that transportation and recreation facilities accommodate pedestrians and bicycles during development projects and roadway construction and upgrades.
- *Pedestrian And Bicycle Liaisons:* The City and County should each designate one existing staff person as Pedestrian and Bicycle Liaison.
- *Pedestrian And Bicycle Advisory Committee:* A new ad hoc Pedestrian and Bicycle Advisory Committee should be formed to assist the Pedestrian and Bicycle Program liaisons.
- *Revise Ordinances:* Frederick County, City of Winchester, and Town of Stephens City should revise their comprehensive plans, subdivision ordinances, and zoning ordinances to ensure better accommodations for pedestrians and bicycles. Developer-provided pedestrian and bicycle accommodations should meet the new design standards.
- *Develop A Maintenance Program*: The City and County should develop a schedule for maintaining pedestrian and bicycle facilities.
- *Provide Training And Professional Development:* Conduct regional pedestrian and bicycle training periodically, and encourage staff to attend conferences with educational opportunities on pedestrian and bicycle facility planning and design, and encourage the Pedestrian and Bicycle Liaisons to join the Association of Pedestrian and Bicycle Professionals (APBP).
- *Pursue Additional Funding:* Pursue additional grant sources and capital funding as necessary to supplement developer-financed pedestrian and bicycle facilities.

Short Term Programs (Education, Encouragement, Enforcement)

The education, encouragement, and enforcement strategies identified below are recommended to be implemented within the next five years. These programs are intended to promote and increase the safety of walking and bicycling locally.

- *Seek Funding To Initiate A Safe Routes To School Program:* The Pedestrian and Bicycle Program Liaisons should work with local schools to apply to VDOT for Federal grant funding to establish a SRTS pilot program at local schools.

- *Unify And Strengthen Existing Education Programs:* Groups that are already organizing education/encouragement events such as the Winchester Green Circle Fall Fitness Fair and Valley Health's Community Wellness Festival should coordinate on event dates and themes to reinforce new messages each year.
- *Walk And Bicycle To School Day:* The Pedestrian and Bicycle Program Liaisons should work with local schools to increase participation in International Walk and Bicycle to School Day (held each year in October).
- *Bicycle And Walking Rodeos*: Existing bicycle and walking rodeos should continue and more should be conducted each year.
- *Pedestrian And Bicycle Safety Education In Schools*: The Pedestrian and Bicycle Program Liaisons should work with the schools to incorporate bicycle and pedestrian safety education in elementary and middle schools throughout the area. Grant funding may be needed to support this activity.
- *Bicycle Safety Education For Adults:* The MPO should work with the Winchester Wheelmen to sponsor and promote adult cycling classes offered by the Virginia Bicycling Federation.
- *Pedestrian And Bicycle Awareness Campaign:* The MPO should investigate partnering with the metropolitan Washington Council of Governments on the Street Smart Pedestrian and Bicycle Safety Public Awareness Campaign.
- *Safety Awareness Week:* Law Enforcement officers should conduct a "Focus on Pedestrians" safety campaign.
- *Corridors-To-Campus Initiative:* Working with University officials, the PBAC should support a corridors-to-campus initiative designed to identify, and implement strategies to support walking and bicycling to and from Shenandoah University and between the campus locations.

Medium Term Recommendations (0 to 10 years)

There are a number of recommended projects and programs that are very important for improving pedestrian and bicycle conditions in the Winchester-Frederick region, but are likely to take longer to implement than the short term initiatives. These projects and programs are classified as medium term recommendations. Though these recommendations are designed for a 10-year timeframe, the Town, City, and County should take advantage of opportunities that arise to implement the projects and programs sooner.

Medium Term Sidewalk Installation and Reconstruction (Including ADA Improvements)

The locations in the Table below have been identified for sidewalk installation, reconstruction, and ADA improvements in the medium term. (Refer to the maps in Chapter 5 for project limits)

City of Winchester:

- Berryville Avenue (S. Pleasant Valley Road to City of Winchester eastern border)
- N. East Lane (National Ave to E. Piccadilly Street)
- Piccadilly Street (N. East Lane to Fairmont Ave)
- Merrimans Lane (City of Winchester western border to Meadow Branch Ave)
- Millwood Avenue (Lowry Drive to City of Winchester eastern border)
- Washington Street (W. Fairfax Lane to Handley Boulevard)
- Fairmont Avenue (W Piccadilly Street to City of Winchester north border)
- N. Loudoun Street (N. Cameron Street to City of Winchester north border)
- Papermill Road (S. Loudoun Street to S. Pleasant Valley Road)

Town of Stephens City:

- Fairfax Street (Main Street to Town of Stephens City eastern border)

Frederick County (within the WinFred MPO):

- Frederick Pike, Rt. 522 (Fairmont Ave to Long Green Lane)
- Berryville Pike (City of Winchester eastern border to Greenwood Road)
- Merrimans Lane (Orchard Lane to City of Winchester western border)
- Millwood Pike (City of Winchester eastern border to Arbor Court)
- Warrior Drive (Fairfax Pike to Tasker Road)
- Fairfax Pike (Town of Stephens City western border to Line Drive)
- Tasker Road (Rutherford Lane to White Oak Road)
- Aylor Road (Tasker Road to Village Lane)
- Northwestern Pike, Rt. 50 (western border of City or Winchester to Spinning Wheel Lane)
- Martinsburg Pike (City of Winchester north border to Park Center Drive)

Medium Term Bicycle Facilities

The locations in the Table below have been identified for on-street bicycle facilities in the medium term. (Refer to the maps in Chapter 5 for project limits)

City of Winchester:

- Millwood Avenue

- Berryville Avenue, Rt. 7
- Merrimans Lane
- Loudoun Street (portions not completed during the short term)
- Braddock Street
- Washington Street
- Handley Boulevard
- Fox Drive

Frederick County (within the WinFred MPO):

- Rt. 37 Trail (along existing and proposed bypass)
- Martinsburg Pike (Route 11)
- Millwood Pike
- Berryville Pike, Rt. 7
- Merrimans Lane
- Sulphur Spring Road
- Fox Drive
- Echo Lane
- Glentawber Road
- Old Charles Town Road
- Milburn Road
- Jordan Springs Road/Stephenson Road
- Woods Mill Road
- Double Church Road
- Brandy Lane
- Shady Elm Road
- Redbud Road
- Indian Hollow Road
- Welltown Road
- Hiatt Road
- Rest Church Road
- Hopewell Road
- Brucetown Road
- Ivory Drive
- Macedonia Church Road
- White Oak Road
- Hudson Hollow Road
- Forest Lake Drive
- Town Run Lane

Medium Term Shared-use Paths

As mentioned previously, in the short term, most of the proposed shared use paths shown on the Proposed Bicycle & Pedestrian Network Map should be constructed as part of the development process. In the medium term, missing trail segments should be identified and developed. New trail construction projects should also be developed in the medium term, such as the Rt. 37 Loop Trail. The cost for filling gaps in shared-use paths is expected to be approximately $340,000 per mile.

Medium Term Roadway Crossing Improvements

The locations identified below should be prioritized for roadway crossing improvements in the medium term. Roadway crossing improvements include ADA curb ramps, pedestrian countdown signals, raised medians, and other improvements (as recommended in Appendix A of this plan) to improve the safety of pedestrians and bicyclists crossing the roadway. (Refer to the maps in Chapter 5 for project limits)

City of Winchester:

- N. Pleasant Valley Road and Berryville Avenue/National Avenue
- N. Pleasant Valley Road and Woodstock Lane
- S. Pleasant Valley Road and Millwood Avenue
- Berryville Avenue near Elm Street/Fort Collier Road
- Featherbed Lane and S. Loudoun Street

Frederick County (within the WinFred MPO):

- Interstate 81 crossing at proposed trail to the south of Rt. 37
- Interstate 81 crossing at proposed trail to the south of Martinsburg Pike
- Interstate 81 crossing at proposed trail to the north of Papermill Road
- Interstate 81 crossing at proposed trail to the south of Papermill Road
- Interstate 81 crossing at proposed trail to the north of Stephens City
- Rt. 37 crossing at proposed trail coming from Abrams Creek Wetlands Preserve
- Rt. 37 crossing at proposed trail near Martinsburg Pike
- Proposed crossing of the Rt. 37 trail with Berryville Pike

Medium Term Policies and Planning

The policies identified below are meant to serve as the second step to ensuring that local design guidelines, ordinances, regulations, and other policies are supportive of including facilities for pedestrians and bicycles.

- *Revise The Pedestrian & Bicycle Mobility Plan:* The Pedestrian & Bicycle Mobility Plan should be updated once every 10 years to respond to changing local conditions.
- *Maintenance Website And Hotline:* Once a regular schedule for pedestrian and bicycle facility maintenance is established, a website and phone hotline should be established to allow residents to report maintenance problems and request spot repairs.
- *Maintenance Manager:* As need arises, the County should identify a lead staff person as a Maintenance Manager to organize and keep track of both regular and remedial inspection and maintenance of the pedestrian and bicycle network.
- *Trend-Setter Policy*: The Town, City, and County can serve as trend-setters by becoming early implementers of some of the recommendations in this plan, such as the provision of bicycle parking racks near their facilities, and offering incentives to people who walk or bike to work.
- *ADA Transition Plan:* The Town, City, and County should complete an Americans Disabilities Act (ADA_ plan for the elements of the public right of way.

Medium Term Programs (Education, Encouragement, Enforcement)

The education, encouragement, and enforcement strategies identified below are recommended to be implemented in the medium term. These programs are intended to promote and increase the safety of walking and bicycling locally.

- *Safety City:* The Pedestrian and Bicycle Program Liaisons could apply for grant funding to install and run a permanent "Safety City" program in order to provide pedestrian and bicycle education to children.
- *Media Outreach And Website:* The Pedestrian and Bicycle Advisory Committee (PBAC) should develop a media outreach plan to promote bicycling and walking and to educate various constituencies throughout the region.
- *Employee Pedestrian And Bicycle Commute Incentives Program:* The City of Winchester and Frederick County should encourage pedestrian and bicycle commuting by providing information about economic benefits, health benefits, and potential commuting routes to employers and employees.
- *Initiate An Adopt-A-Trail Program:* In order to support pedestrian and bicycle facilities, the City of Winchester and Frederick County should implement an "Adopt-a-Trail" program.
- *Bicycle And Walking Maps:* The Win-Fred MPO, the Tourism Board, the Convention and Visitors Bureau and/or local agencies should partner with the Chamber of Commerce develop maps of walking and bicycling

routes. Existing maps should be updated periodically, and new maps should be developed.

- *Community Events:* The Pedestrian and Bicycle Program Liaisons should work with the PBAC, the Winchester Wheelmen, the Winchester Green Circle and local volunteer groups to sponsor regular rides and events in the Winchester-Frederick area.
- *Community Advocacy Programs*: The Winchester Wheelmen and the Shenandoah Valley Runners can take the lead in developing a community-wide advocacy program to raise awareness of bicycle and pedestrian issues.
- *Crosswalk Enforcement Programs:* Educate law enforcement officers about how to conduct a crosswalk enforcement program.
- *Involve Law Enforcement In SRTS Activities*: Law enforcement officers with the City and County should actively participate in Safe Routes to School (SRTS) programs.

Long Term Recommendations (0 to 25 years)

Long term recommendations include filling additional sidewalk gaps, adding additional on-street bicycle facilities, and constructing much of the off-street trail system that is shown on the maps in Chapter 5.

While these recommendations may be included in the long term category, there may be opportunities for implementing them sooner. For example, pedestrian and bicycle facilities could be added as a part of a new roadway project added to the Transportation Improvement Program or a new pedestrian and bicycle program could be provided by applying to a new grant funding source. The Town, City, and County should take advantage of these opportunities for implementation.

Programs that began in the first 10 years of implementation should grow in the long term. Refinements should be made based on lessons learned during the first 10 years.

Implementation Schedule

Below is an implementation schedule that identifies the organizations and agencies responsible for executing the recommendations of the plan during its 25-year implementation timeframe.

Implementation Schedule for the Recommendations in this Plan

PB = Pedestrian and Bicycle Advisory Committee
BS = Board of Supervisors
BU = Local Businesses
CI = City
CO = County
CV= Community Volunteer Groups
HE= Local Health Organizations
MPO = Win-Fred MPO
PC = Planning Commission
PW = County and Municipal Public Works Departments
PD = County and City Police Departments
S = Local School Districts
SU = Shenandoah University
T = Town
TR = Local Tourism Organizations
VDOT = Virginia Department of Transportation

Pedestrian and Bicycle Infrastructure Projects	**Responsibility**	**Implementation Schedule**						
Recommendations		Year 1	Year 2	Year 3	Year 4	Year 5	Years 6-10	Years 11-25
Short-Term Projects	CI, CO, T, VDOT							
Medium-Term Projects	CI, CO, T, VDOT							
Long-Term Projects	CI, CO, T, VDOT							

Pedestrian and Bicycle Policies	**Responsibility**	**Implementation Schedule**						
Recommendations		Year 1	Year 2	Year 3	Year 4	Year 5	Years 6-10	Years 11-25
Development Review	CI, CO, T, VDOT							
Pedestrian and Bicycle Program Liaisons	CI, CO							
Pedestrian and Bicycle Advisory Committee	CI, CO							
Revise Ordinances	CI, CO, PC							
Develop a Maintenance Program	CI, CO, VDOT							
Maintenance Website and Hotline	CI, CO							
Designate a Maintenance Manager	CO							
Provide Training and Professional Development	MPO, VDOT, T, CI, CO							
Pursue Additional Funding	T, CI, CO							
Trend-Setter Policy	T, CI, CO							
ADA Transition Plan	T, CI, CO							

Pedestrian and Bicycle Programs	Responsibility	Implementation Schedule						
Recommendations		Year 1	Year 2	Year 3	Year 4	Year 5	Years 6-10	Years 11-25
Seek Funding to Initiate a Safe Routes to School Program	CI, CO, S							
Unify and Strengthen Existing Education Programs	CV, HE							
Walk and Bicycle to School Day	CI, CO, S							
Bicycle and Walking Rodeos	CI, CO, CV, HE							
Safety City	CI, CO							
Pedestrian and Bicycle Safety Education in Schools	CI, CO, S							
Bicycle Safety Education for Adults	MPO, CV							
Pedestrian and Bicycle Awareness Campaign	MPO							
Media Outreach and Website	PB							
Bicycling and Walking Maps	TR							
Community Events	CI, CO, CV, HE							
Employee Pedestrian and Bicycle Commute Incentives Program	CI, CO							
Community Advocacy Programs	CV, HE							
Crosswalk Enforcement Program	PD							
Safety Awareness Week	PD							
Involve Law Enforcement in SRTS Activities	PD							
Start an Adopt-a-Trail Program	CI, CO							
Corridors-to-Campus Initiative	PB, SU							

PB = Pedestrian and Bicycle Advisory Committee
BS = Board of Supervisors
BU = Local Businesses
CI = City
CO = County
CV= Community Volunteer Groups
HE= Local Health Organizations
MPO = Win-Fred MPO
PC = Planning Commission
PW = County and Municipal Public Works Departments
PD = County and City Police Departments
S = Local School Districts
SU = Shenandoah University
T = Town
TR = Local Tourism Organizations
VDOT = Virginia Department of Transportation

Facility Development Strategies

This section describes several strategies that can be used to develop the pedestrian and bicycle facilities recommended in this plan. It is essential for the County, City, and Town to implement the most cost-effective strategies in order to have the greatest impact with a finite amount of resources available for pedestrian and bicycle transportation and recreation. The first part of this section describes strategies for the development of pedestrian and on-street bicycle facilities (within the roadway right-of-way), and the second part describes strategies for off-street facility development.

On-Street Facility Development Strategies

The implementation of on-street pedestrian and bicycle facilities is the responsibility of the jurisdiction with control over the roadway. For state roadways, VDOT is the responsible entity. Local Planning Departments are responsible to work with VDOT to achieve the desired type of pedestrian and bicycle facilities on state roadways and to implement pedestrian and bicycle facilities on roadways under their own control.

Roadway construction, re-construction, and maintenance projects offer excellent opportunities to incorporate facility improvements for non-motorized modes. It is much more cost-effective to provide bicycle and pedestrian facilities along with these projects than to initiate the improvements later as "retrofit" projects. The list below includes several types of roadway projects that can incorporate pedestrian and bicycle facilities.

- New roadway construction
- Roadway reconstruction
- Restriping
- Repaving
- Replacing roadway bridges
- Retrofitting roadways with new pedestrian and bicycle facilities
- Signage and wayfinding projects

Note that VDOT's programmed roadway improvements are a response to requests made by local jurisdictions. Therefore, it will be necessary for Frederick County, the City of Winchester, and the Town of Stephens City to continue to advance high priority pedestrian and bicycle projects by incorporating construction of new sidewalks, trails, and on-road bikeways and retrofit projects for pedestrian and bicycle facilities into regional lists of recommended roadway resurfacing and reconstruction projects.

Off-Street Facility Development Strategies

Off-street facilities may be built in numerous ways, as described below, but primarily through the development process. Local governments are responsible to work toward filling gaps left after development is complete. Local governments may also choose to move forward with the development of additional trails that would be unlikely to occur as part of new development.

Acquisition of land for multi-use trails is an important part of the off-street trail development process. Strategies for acquisition include:

- Government regulation (incentive zoning, negotiated dedications, fee-in-lieu, buffer/transition zones, overlay zones, subdivision exactions)
- Obtaining support from local land trusts and other organizations
- Providing educational material to property owners and developers about the benefits of multi-use trails and land donations/easements
- Obtaining easements (conservation, preservation, and public access easements)
- Acquisition (donation/tax incentives, fee simple purchase, easement purchase, purchase/lease back, bargain sale, purchase of development rights)
- Eminent Domain (last resort)
- Condemnation (last resort)

An excellent resource for greenway development strategies is the Virginia Greenways and Trails Toolbox (2000) (http://www.dcr.virginia.gov/prr/docs/toolbox.pdf). This document includes information about greenway funding and development, planning, construction, and maintenance. Once land for the trail has been acquired, it will be necessary to secure funding in order to build it.

Funding

Funding is essential for implementing the recommendations of this Plan. New trails, on-road bikeways, and sidewalk projects, programs, and maintenance activities will need to be funded through various sources. Because of this, it will be important for the County, City, and Town to:

- Establish specific funding sources to use as matching funds for federal, state, and other grants. These funds can be generated through donations from community groups, through the proffer system, and through the capital budget if necessary.
- Partner with local governments and adjacent jurisdictions to develop funding sources

- Look for additional funding opportunities from the public and private sectors

This section describes available funding sources for pedestrian and bicycle facilities.

Locally, funding priorities are developed for transportation projects by the Metropolitan Planning Organization (MPO) Transportation Improvement Program (TIP), by the Frederick County Eastern Road Plan, by the Frederick County Capital Improvement Plan (CIP), and by the VDOT Six-Year Improvement Plan. The TIP is developed by members of the MPO and is regularly updated. The CIP is adopted by the Frederick County Board of Supervisors and recommended by the Frederick County Planning Commission.

Several other Frederick County plans list priorities for transportation improvements. These include the Frederick County Interstate Road Improvement Plan, Primary Road Improvement Plan, and Secondary Road Improvement Plan. The Frederick County Road Improvement Plans are developed by the County staff, the County Transportation Committee, the County Planning Commission, and the Board of Supervisors with assistance from VDOT.

The VDOT Policy for Integrating Bicycle and Pedestrian Accommodations applies to all projects in the TIP, CIP, and County Plans, that involve VDOT right of way or use funds that flow through VDOT. This policy requires that these projects will be initiated with the presumption that they will accommodate pedestrians and bicyclists. However, it will still be important for the County, City, and Town to continue to make specific requests for pedestrian and bicycle facilities to be included in project descriptions within the TIP, CIP, County Plans. In addition, the County, City, and Town should monitor the planning, design, and construction of these projects to ensure that they accommodate pedestrians and bicyclists adequately.

There are several other sources of VDOT funding that can be used to develop pedestrian and bicycle facilities (see table below). Most of the funding sources described below require a local match – up to 20% of the project cost, in some cases (with the exception of the Safe Routes to Schools Program, which is 100% Federal funding). Fortunately, in-kind donations of materials, labor, and land can be used as matching funds. Through a creative strategy of volunteer assistance and land donation, other Virginia counties have been able to generate matching funds with very little capital outlay.

VDOT Funding Sources

Rural Transportation Planning Program

Purpose	This program provides funds to planning district commissions to carry out transportation planning for rural areas.
Funding	▪ Federal funds finance 80% of program activities and grants ▪ A match of at least 20% from a planning district commission or locality is required
Eligible projects	▪ Pedestrian and bicycle planning, greenway planning
Eligible applicants	▪ Planning district commissions
Contact	VDOT Staunton District http://www.vdot.virginia.gov/about/staunton_quick.asp

Highway Construction Program

Purpose	This program provides funding for the preliminary engineering, right of way acquisition, and construction of highway projects.
Funding	No local match is needed for projects on primary and secondary system roads. A 2% local match is required for projects on urban system roads
Eligible projects	▪ Pedestrian and bicycle accommodations can be built as part of highway projects ▪ Pedestrian and bicycle accommodations can be built as individual projects, separate from the construction of highways, either on highway or independent right of way
Contact	VDOT Staunton District http://www.vdot.virginia.gov/about/staunton_quick.asp

Pedestrian and Bicycle Safety Program

Purpose	This program was developed to implement safety projects addressing pedestrian and bicycle crashes or the potential for such crashes, with evaluations based on risk and applications competing with like projects.
Funding	▪ Up to 90% of a project can be financed with federal funds ▪ A project must have a minimum 10% match
Eligible projects	▪ Construction of on-street facilities and shared use paths ▪ Development of treatments for intersections ▪ Installation of signs and pavement markings
Eligible applicants	▪ State and local agencies may apply to the program
Contact	VDOT Mobility Management Division – HSIProgram@vdot.virginia.gov 804-786-9094

Transportation Enhancement Program

Purpose	This program is an initiative to focus on enhancing the travel experience and fostering the quality of life in American communities
Funding	▪ Up to 80% of a project can be financed with federal funds. A local match of at least 20%, from other public or private sources, is required. ▪ Local matches may be in-kind contributions including tangible property, professional services and volunteer labor ▪ This is a reimbursable program
Eligible projects	▪ Pedestrian and bicycle facilities such as sidewalks, bike lanes and shared use paths ▪ Pedestrian and bicycle safety and educational activities such as classroom projects, safety handouts and directional signage for trails ▪ Preservation of abandoned railway corridors such as the development of a rails-to-trails facility
Eligible applicants	▪ Any local government, state agency, group or individual may apply to the program. All projects need to be formally endorsed by a local jurisdiction or public agency.
Contact	Transportation Enhancement Program Staff, VDOT Local Assistance Division, www.VirginiaDOT.org, "Programs" section

Safe Routes to Schools Program – NEW PROGRAM

Purpose	This program provides funding for engineering, education, enforcement, encouragement, and evaluation activities that are aimed at making it safer and more appealing for children to walk and bicycle to school.
Funding	▪ 100% of the cost of the program can be financed with Federal funds ▪ No match is required. ▪ This is a reimbursable program
Eligible projects	▪ Engineering projects such as traffic calming, sidewalk installation, intersection improvements, warning signage and crosswalks markings, among others ▪ Education programs such as pedestrian and bicycle safety classes, bike rodeos, and motorist education programs ▪ Encouragement programs such as Walking School Buses, Bike Trains, Walk to School Day, and other incentives to encourage children and their parents to walk and bicycle to school. ▪ Planning
Eligible applicants	▪ Any local government, state agency, or non-profit may apply to the program.
Contact	Jakob Helmboldt, VDOT Safe Routes to School Coordinator, jakob.helmboldt@vdot.virginia.gov, 804-225-3269

Recreation Access Program

Purpose	This program provides bicycle access to public recreational facilities or historic sites operated by a state agency, a locality, or a local authority, either with an access road or on a separate bicycle facility.
Funding	▪ This program uses state funds only. ▪ Up to $75,000 may be awarded for bicycle access to a facility operated by a state agency. ▪ UP to $60,000 may be awarded for bicycle access to a facility operated by a locality or local authority, with a $15,000 match.
Eligible projects	Construction, reconstruction, maintenance, or improvement of bikeways.
Eligible applicants	A governing body of a county, city or town may make an application to this program
Contact	Hugh Adams, 804-786-2744, hugh.adams@vdot.virginia.gov

	VDOT Local Assistance Division

National Scenic Byways Program

Purpose	This program supports projects to improve the quality and continuity of the traveler's experience on highways designated as National Scenic Byways, All American Roads, or a state scenic byway.
Funding	▪ Up to 80% of a project can be financed with federal funds ▪ A project must have a minimum 20% match ▪ This is a reimbursable program
Eligible projects	▪ Construction of a facility for pedestrian and bicyclists along a scenic byway ▪ Safety improvements to reduce or eliminate the incidence or likelihood of crashes or conflicts with bicyclists and pedestrian
Eligible applicants	Any local government, state agency, group or individual may apply to the program.
Contact	Scenic Byways Program Staff VDOT Local Assistance Division 804-786-2264 h.chenault@vdot.virginia.gov www.bywaysonline.org, "Grants" section

Source: Information in the tables above was derived from a VDOT brochure entitled: VDOT Funding for Bicycling and Walking Accommodations.

Appendix A: Bicycle and Pedestrian Facility Design Guidelines

This chapter includes design guidance for pedestrian, bicycle, and greenway facilities. All non-motorized transportation and recreation facilities in the Winchester-Frederick region should be designed to meet State and Federal design guidance and standards, as defined by the American Association of State Highway Transportation Officials (AASHTO), the Americans with Disabilities Act, and the Manual on Uniform Traffic Control Devices (MUTCD). If the national standards are revised in the future, the new national standards should be followed.

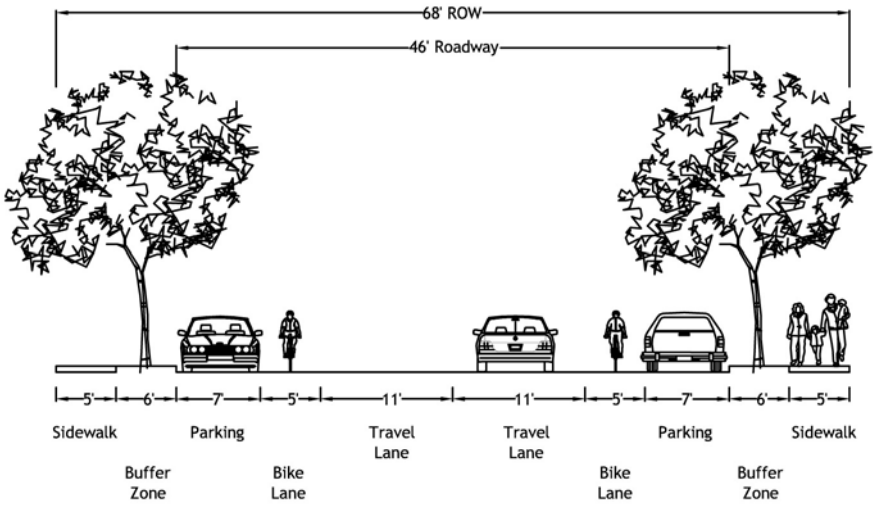
The publications listed below should be consulted for in-depth information on the design of pedestrian and bicycle facilities:

- *Virginia Bicycle Facility Resource Guide*. Virginia Department of Transportation, 2002.
- *VDOT Policy for Integrating Bicycle and Pedestrian Accommodations,* March 18, 2004.
- *Guide to the Development of Bicycle Facilities*. Updated in 1999 by the American Association of State Highway Transportation Officials (AASHTO). Available from AASHTO. www.aashto.org/bookstore/abs.html
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, 2004, by the American Association of State Highway Transportation Officials (AASHTO). Available from AASHTO. www.aashto.org/bookstore/abs.html
- *Manual on Uniform Traffic Control Devices (MUTCD)*. Published by the U.S. Department of Transportation, Washington, DC, 2001
- *Americans with Disabilities Act Accessibility Guidelines*. U.S. Department of Justice, United States Access Board. Guidelines are available at http://www.access-board.gov/adaag/html/adaag.htm
- *Designing Sidewalks and Trails for Access: Part Two - Best Practices Design Guide*. Published by U.S. Department of Transportation, Washington, DC, 2001
- *International Building Code*. Published by International Code Council (ICC), 2006.

Typical Roadway Cross Sections for Pedestrian and Bicycle Accommodation

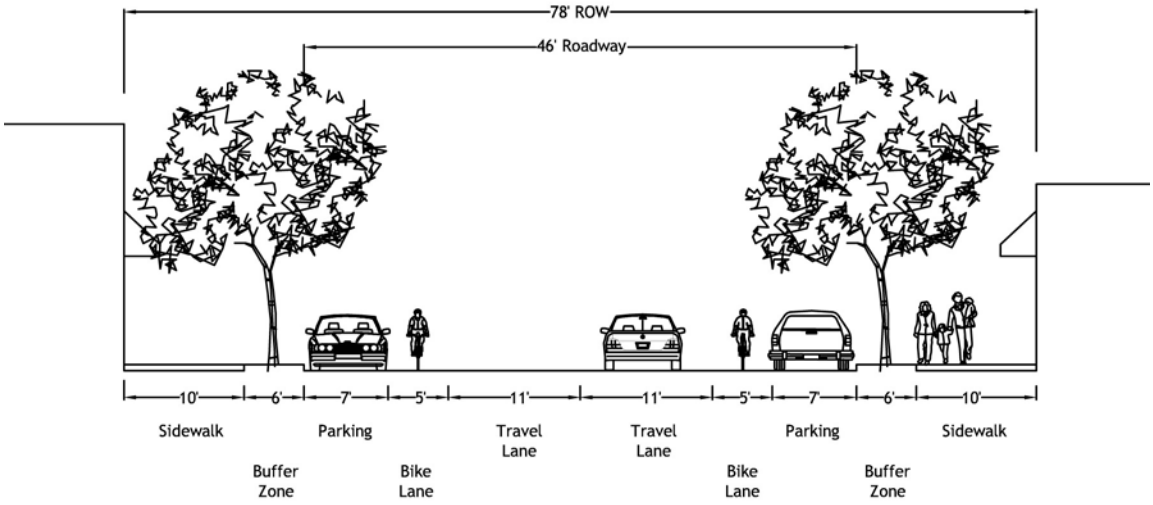
Locally, there are a number of different typical roadway cross sections. Pedestrian and bicycle facilities should be incorporated into all of the typical sections. The City of Winchester groups roadways into Category I, Category II, and Category III Streets. Common VDOT typical sections, as used in Frederick County and the Town of Stephens City, are U2, U4D, U6D, and R4D. The different roadway types will be described and illustrated below with the inclusion of pedestrian and bicycle facilities.

City of Winchester Category II Street and VDOT U2 Roadway



VDOT U2 Typical Section / City of Winchester Category II Street:
Shown with 2 lanes with on-street parking, bike lanes buffer zones, and sidewalks

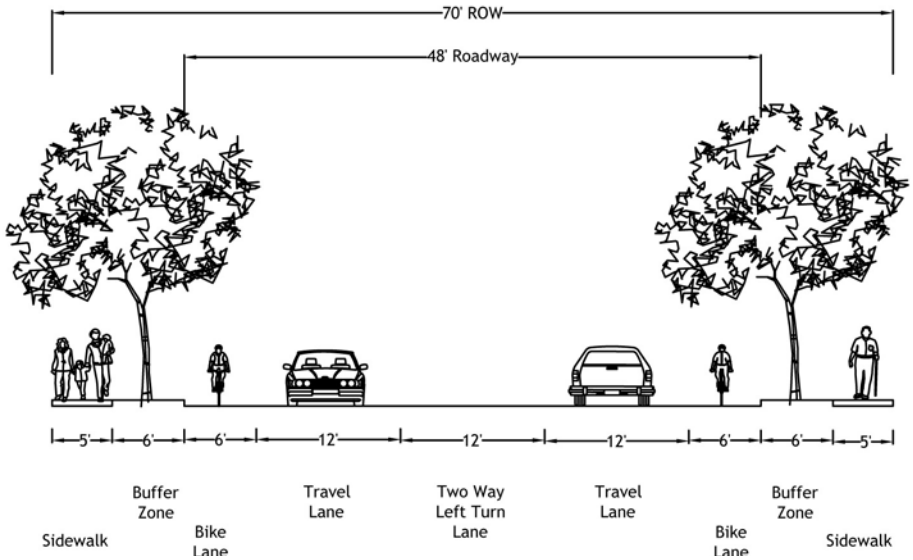
The first two typical sections represent both a City of Winchester Category II street, and a VDOT U2 roadway. The first section shows the typical section in a non-commercial area, the second is in a commercial area. In Winchester, a Category II street is defined as "a street or road that carries a present or anticipated traffic volume from 5,000 to 8,000 vehicles per day; a maximum grade of 9%, a design speed of up to 35 mph, a minimum street width of 36 feet and a minimum right of way width of 50 feet." A VDOT U2 section is an urban two-lane roadway with curb and gutter. Bike lanes, sidewalks, and buffer zones between the sidewalk and the street should be included on streets with these sections. Narrow travel lanes are recommended in order to discourage drivers from exceeding the speed limit, as a result, 11 feet travel lanes are recommended. In a commercial area, the same typical section would be used, but the sidewalks are widened to accommodate increased pedestrian traffic.



VDOT U2 Typical Section / City of Winchester Category II Street in a Commercial Area: 2 lanes shown with on-street parking, bike lanes buffer zones, and wider sidewalks

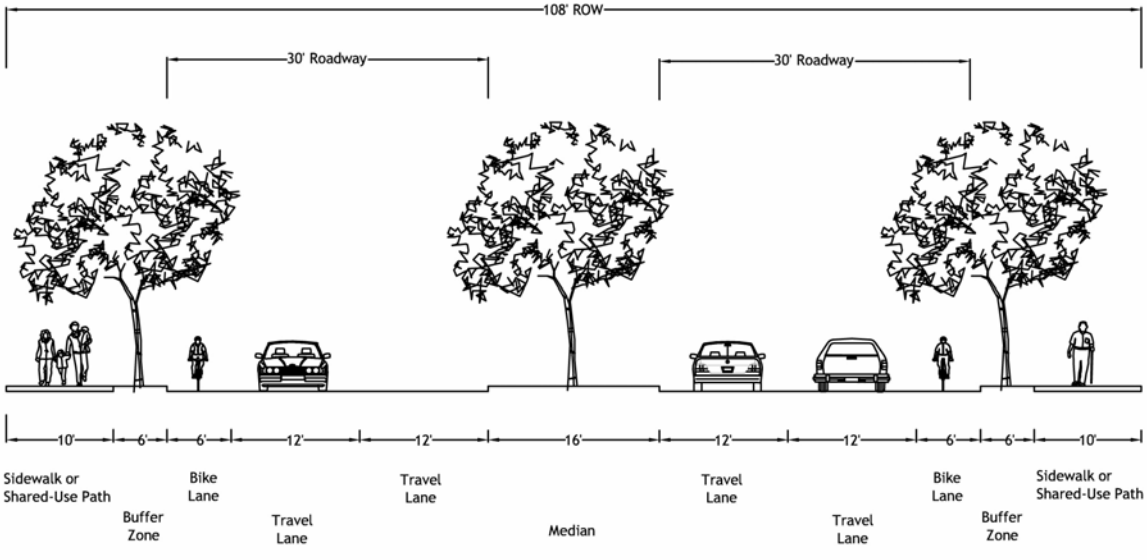
City of Winchester Category III Street and VDOT U4D Roadway

The City of Winchester Category III Street is defined as follows, "a street or road that carries a present or anticipated traffic volume greater than 8,000 vehicles per day; a maximum grade of 9%, a design speed up to 50 miles per hour, a minimum street width of 48 feet, and a minimum right of way width of 70 feet.



City of Winchester Category III Street: Shown with 2 lanes with two-way left turn lane, bike lanes, buffer zones, and sidewalks (widen sidewalks if in a commercial area)

On street parking shall not be allowed. Access shall be limited to intersections with public streets and curb cuts to private property that are no closer than 300 feet. When this type of street is used as the entrance to a subdivision of more than 25 lots, a landscaped median may be required." Two potential typical sections are shown for a Category III street. The first shows a two lane road with a center turn lane, bike lanes, a buffer zone, and sidewalks. Studies suggest that in many cases, streets with a two way left turn lane can accommodate as much vehicular traffic as a four lane roadway.

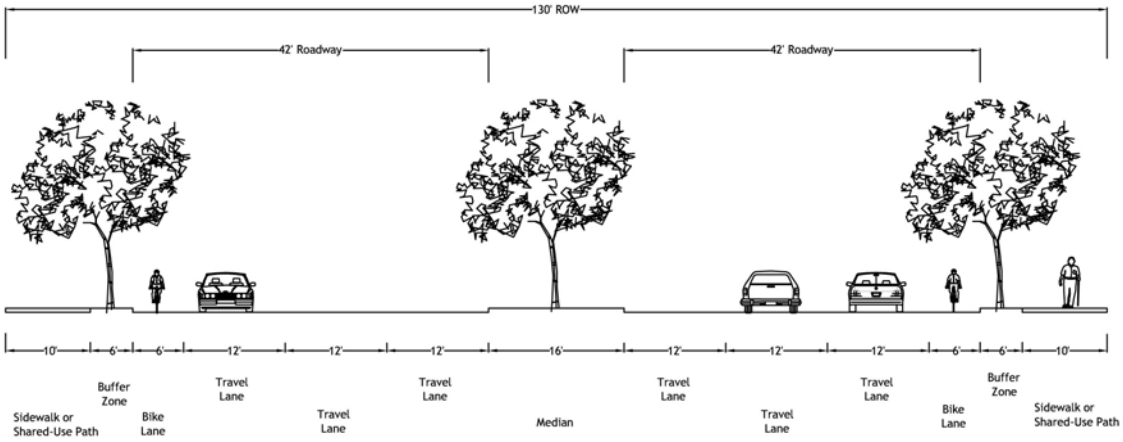


VDOT U4D/City of Winchester Category III Street: **4 lane divided roadway shown with bicycle lanes, buffer zones, and sidewalks/shared use path.**

The second Class III section is a four lane roadway and also serves as an example of the VDOT U4D section, which is an urban 4-lane roadway with curb and gutter. On wider roads with heavier traffic volumes, it is recommended that more space be dedicated to pedestrian and bicycle facilities, for example 6 feet bicycle lanes and 10 feet sidewalks and shared use paths on one or both sides of the roadway. Shared use paths that are adjacent to the roadway require careful design, particularly when they are placed only on one side of the roadway. In areas where there are frequent driveway and intersection crossings, bicycle riders may be less safe on a shared use path than they would be riding in the roadway. As a result, the Idaho Department of Transportation recommends against installing shared use paths when there are more than 8 driveway or intersection crossings per mile. On-street bicycle facilities are recommended even in locations where there are shared use paths adjacent to the roadway.

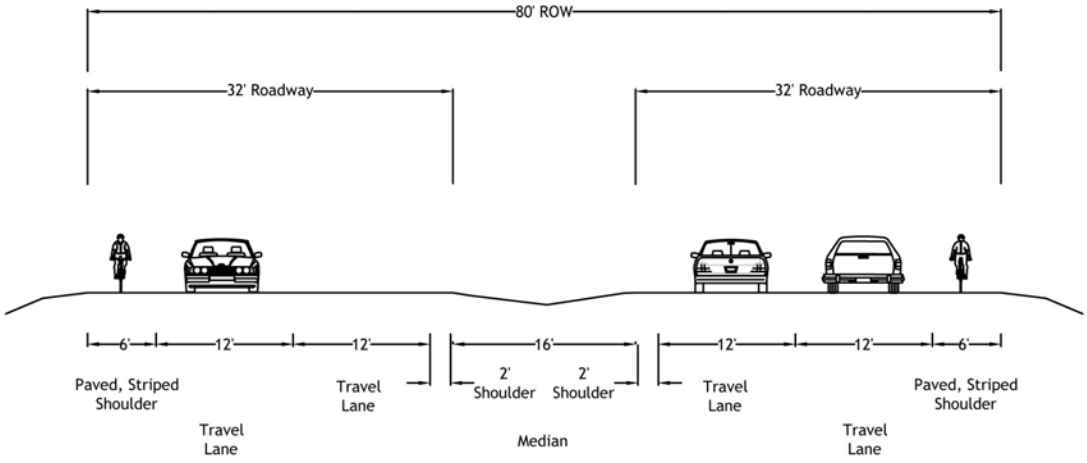
VDOT U6D Roadway

The VDOT U6D typical section is an urban 6-lane divided roadway with curb and gutter. The example shown below illustrates how bicycle lanes, buffer zones, and sidewalks may be accommodated on this typical section. Again, it is recommended that more space be dedicated to pedestrians and bicycles on wider, higher volume roadways, such as 6 feet bicycle lanes and 10 feet sidewalks and shared use paths on one or both sides of the road. See the previous paragraph for more details on shared use paths adjacent to the street.



VDOT U6D: **6 lane divided roadway shown with bicycle lanes, buffer zone, and sidewalks/shared use path**

VDOT R4D Roadway



VDOT R4D: 4 lane divided roadway shown with paved, striped shoulders

The VDOT R4D typical section is a rural 4-lane divided roadway with standard shoulders and ditches. There should be a stripe separating the shoulder from the rightmost travel lane. In areas that are truly rural and without pedestrian demand, the shoulder is shared by pedestrians and bicyclists. In areas that are not rural, sidewalks may be added to this section on either side of the ditches.

On-Street Bicycle Facilities

The on-street bicycle facilities recommended in this section are intended to improve bicycling conditions on roadways and provide a visible indication that bicycling is a mode of transportation that is supported in the Winchester-Frederick region. However, it should be noted that bicyclists are not limited to using roadways with designated bicycle facilities: bicyclists have the legal right under Virginia law to travel on all roadways other than limited access roadways. Bicyclists share the same responsibility as drivers to operate safely and respectfully in the roadway environment and obey all traffic laws.

To understand the bicycle facilities recommended in this plan, it is important to understand how roadway and traffic characteristics affect bicyclists. Several research studies have identified factors that influence bicyclist safety and comfort when riding on roadways[1,2,3,4]. These factors include:

- Effective width of the roadway, which includes the width of the outside lane and paved shoulder/bike lane space
- Presence of a bike lane or paved shoulder
- Motor vehicle traffic volumes on the roadway
- Speed of the traffic on the roadway
- Percent heavy vehicles on the roadway
- On-street parking
- Pavement surface condition

In the late 1990s, groundbreaking research was performed to quantify the influence of each of these factors on the perceptions of bicyclists. One research study had bicyclists rate the characteristics of roadways in the field[5]; another had bicyclists rate roadway segments from video clips[6]. The former study resulted in the Bicycle Level of Service Model, and the latter resulted in the Bicycle

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[1] Landis, Bruce W., "The Bicycle Interaction Hazard Score: A Theoretical Model". *Transportation Research Record* 1438, TRB, Washington, DC, 1994.
[2] Sorton, Alex. "Bicycle Stress Level as a Tool to Evaluate Urban and Suburban Bicycle Compatibility". *Transportation Research Record* 1438, TRB, Washington, DC, 1994.
[3] Epperson, Bruce. "Evaluating Suitability of Roadways for Bicycle Use: Toward a Cycling Level-of-Service Standard". *Transportation Research Record* 1438, TRB, National Research Council, Washington, D.C. 1994.
[4] Davis, Jeff. *Bicycle Safety Evaluation*. Auburn University, 1987.
[5] Landis, Bruce W., et al. "Real-Time Human Perceptions: Towards a Bicycle Level of Service". *Transportation Research Record* 1578, TRB, Washington, DC, 1996.
[6] Harkey, D.L., et al. "Development of the Bicycle Compatibility Index: A Level of Service Concept". Final Report, Report No. FHWA-RD-98-072, Federal Highway Administration, Washington, DC, August 1998.

Compatibility Index. All of the factors listed above were found to influence bicyclists' sense of comfort and safety in the roadway environment.

Both studies identified lateral separation between bicyclists and motor vehicles as one of the most significant factors influencing bicyclist comfort levels. The studies found that bicyclists preferred having wider pavement space to ride on. Further, both studies found that most bicyclists prefer having a shoulder or bike lane stripe provided on roadway segments when compared to the same pavement width without a stripe. In addition, a third study found that motorists give bicyclists more lateral space when bike lanes are striped[7].

These studies provide the background behind the recommendations to provide bicycle lanes and paved shoulders as preferred bicycle facilities for roadways with higher traffic volumes in the Winchester-Frederick region.

Shared Roadways

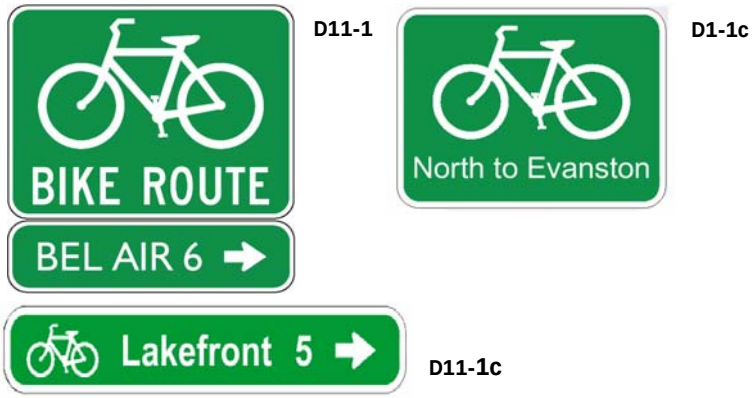
Shared roadways are streets and roads where bicyclists can be served by sharing the travel lanes with motor vehicles. Usually, these are streets with low traffic volumes and/or low speeds, which do not need special bicycle accommodations in order to be bicycle-friendly. There are many low-volume local and rural roadways in the Winchester-Frederick area that are excellent for bicycling in their current condition and need no further improvement to be bicycle compatible.

Bicyclist on a shared roadway

[7] Hunter, William W., et al. "A Comparative Analysis of Bicycle Lanes Versus Wide Curb Lanes: Final Report". Federal Highway Administration, FHWA-RD-99-034, December 1999.

Signed-Shared Roadways

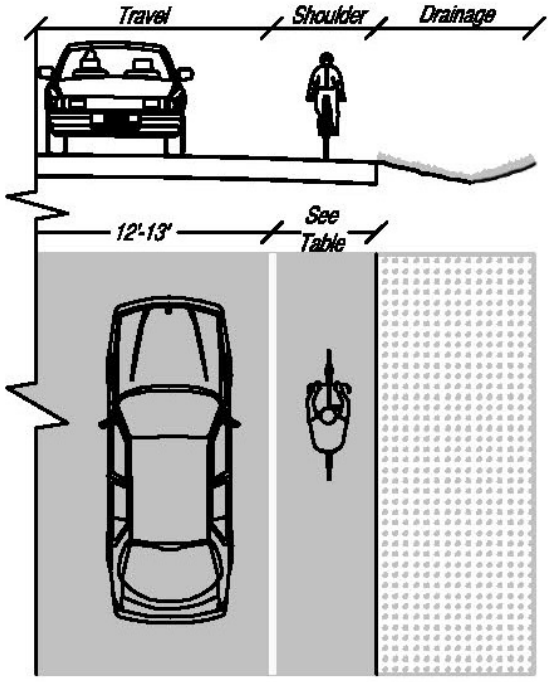
A signed-shared roadway is shared roadway which has been designated by signing as a preferred route for bicycle use. Bike route signs can be posted on key routes between major destinations in the Winchester-Frederick region to indicate to bicyclists that particular advantages exist to using these routes compared with alternative routes. Bicycle route signs should only be posted on roadways where conditions are favorable.



Example of MUTCD signs for designating bicycle routes

Striped/Paved Shoulders

Paved shoulder space improves the safety and comfort of bicyclists. There is no minimum width for paved shoulders, however a width of at least 4 feet is preferred (see the chart below for recommended widths). While paved shoulders are generally acceptable for roadway sections without frequent intersections, on those where intersections are frequent, appropriate bike lane striping should be applied. In rural areas, shoulders also serve as a place for pedestrians to walk or for equestrians to ride. Wider shoulders increase the level of safety and comfort for pedestrians and equestrians. See the description of striped/paved shoulders under pedestrian facilities for additional benefits.

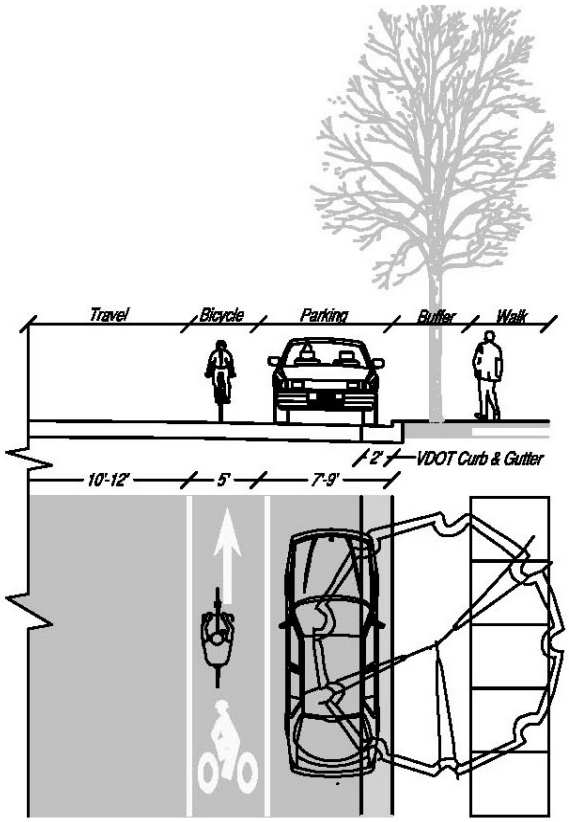


Bicycle Shoulder Width Table		
AADT (< 6% HV)	**Travel Lane**	**Bicycle Treatment**
0-1,500	10'-13'	Shared Lane
1,501-2,000	11'	4' Shoulder
2,001-3,000	11'	4' Shoulder
3,001-6,000	12'	4' Shoulder
6,001-13,500	12'	5' Shoulder
≥ 13,501	12'	6' Shoulder

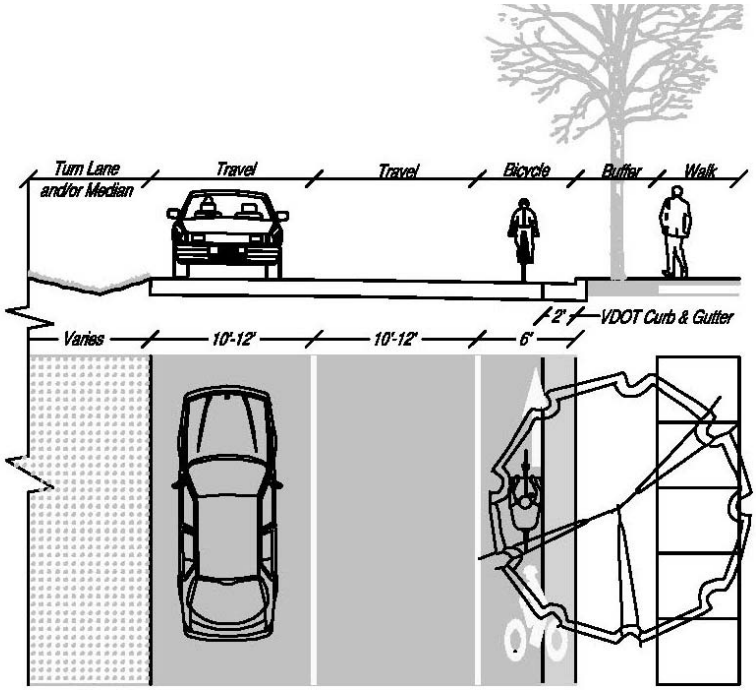
Shoulder on roadway with no parking, ≤ 55mph

Bicycle Lanes

A bicycle lane is a portion of the roadway that has been designated by striping, signing, and pavement markings for the preferential or exclusive use of bicyclists. Bicycle lanes are always located on both sides of the road (except one way streets), and carry bicyclists in the same direction as adjacent motor vehicle traffic. Bicycle lanes should be at least 4-feet wide on roadways with open shoulders and 5-feet wide on roadways with curb and gutter or on-street parking. On curb and gutter roadways, the gutter pan may be included in the 5-foot bicycle lane width, provided the pavement surface is flush with the gutter pan. While 5-foot bicycle lanes are typical, 6-foot bicycle lanes are commonly used on roadways with higher traffic speeds and volumes. Bicyclists retain the right to use the travel lanes on streets with bicycle lanes.



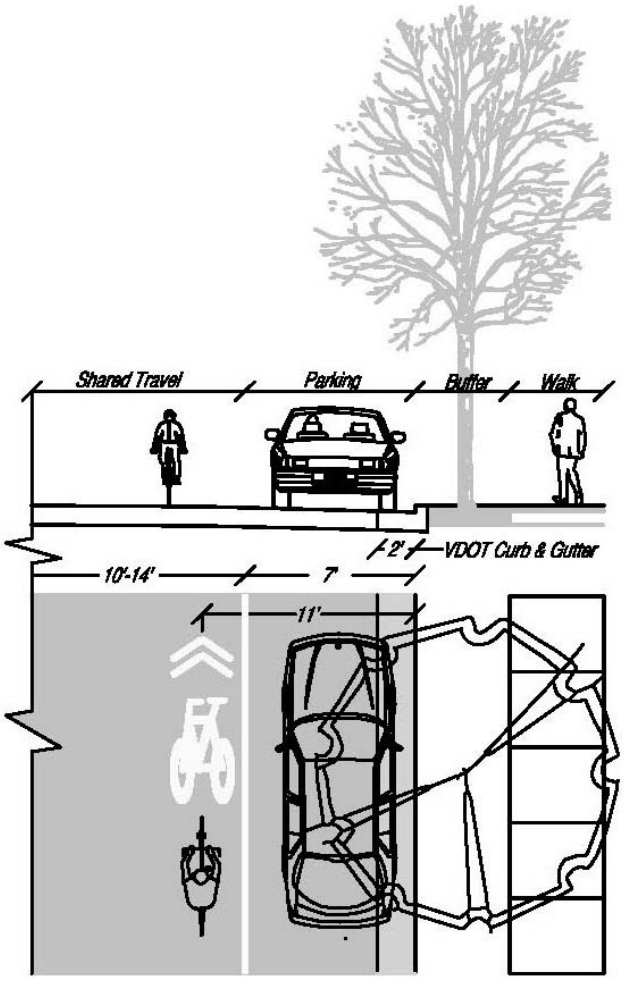
Bicycle lane on roadway with parking, ≤ 30 mph



Bicycle lane on roadway with no parking, ≤ 40 mph

Shared Lane Markings

Shared lane markings can be used on roadways where there is not enough space for bicycle lanes. Shared lane markings alert motorists to expect and accept bicyclists as users of the roadway and to encourage bicyclists to ride outside of the "door zone" of parked cars. These markings have the additional benefits of reducing wrong-way bicycling and increasing the distance between overtaking motorists and bicyclists. The shared lane marking should not be placed on roadways with a speed limit above 35 mph. The Shared Lane Marking should be placed immediately after an intersection and spaced at intervals not greater than 250 feet thereafter.

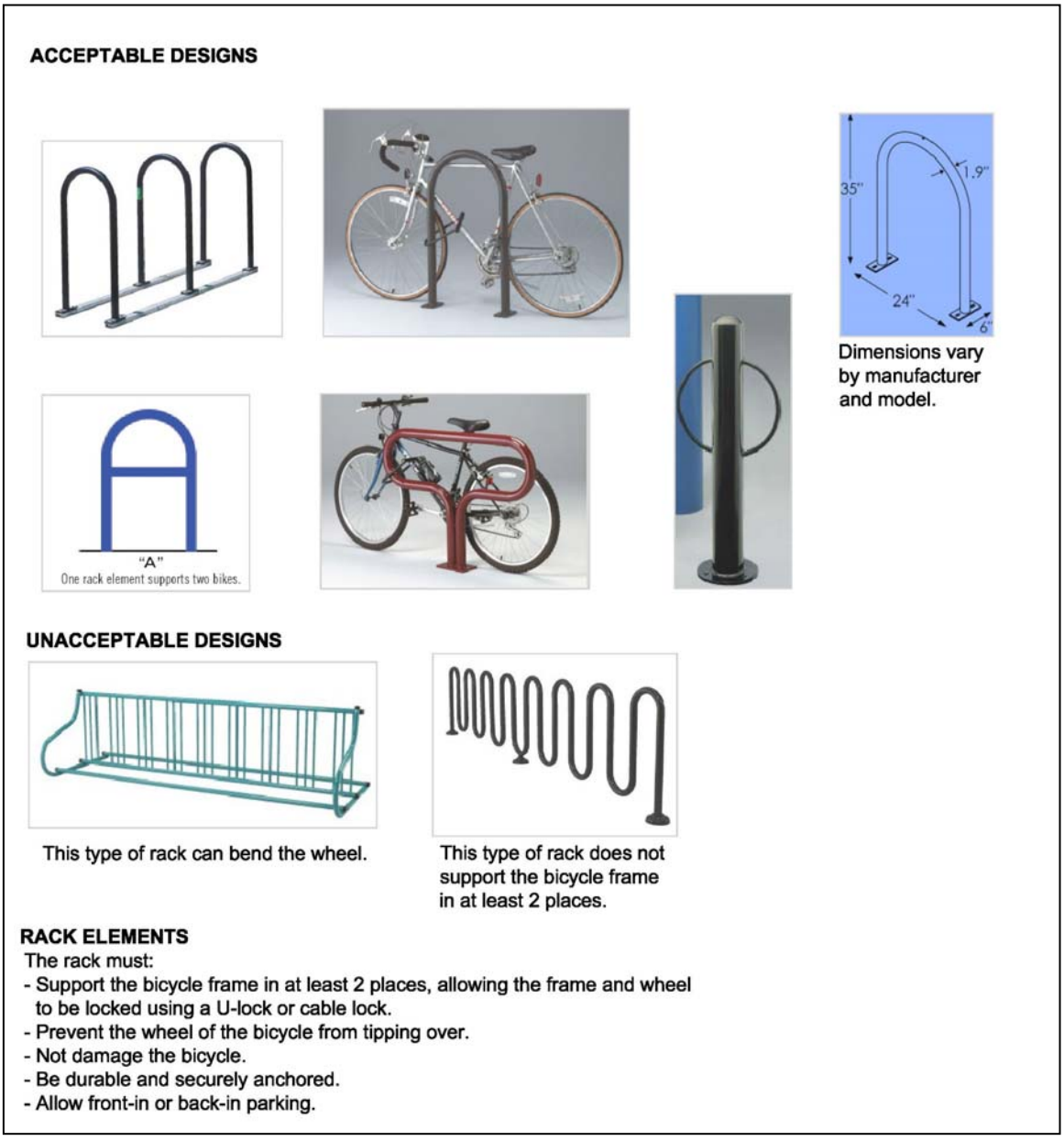


Shared lane marking on constrained roadway with parking and speed limit ≤ 35 mph

"Share the Road" Signs

"Share the Road" signs can be posted on roads that bicyclists use regularly. These signs can increase awareness of bicyclists, especially in areas where bicyclists may not be expected or where many drivers are tourists. A new fluorescent yellow/green color has been is approved in the *Manual on Uniform Traffic Control Devices* and can be used on these signs. Signs should be used judiciously—too many signs can cause visual clutter and lead to non-compliance.

Bicycle Racks and Bicycle Lockers



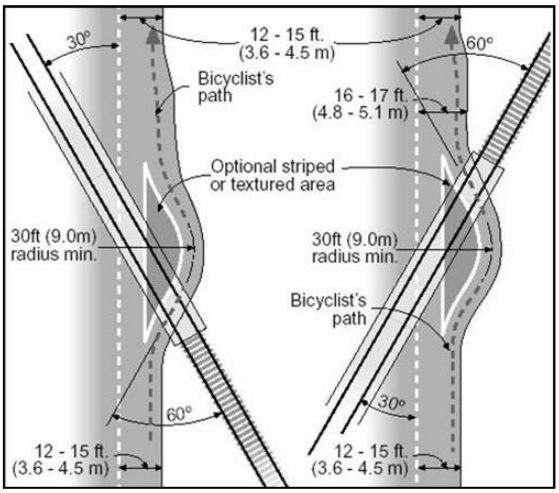
Bicycle Rack Designs

Bike parking can be provided in the form of bike racks or bike lockers. Secure bicycle parking located close to building entrances and transit entry points can make bicycling more attractive. It also reduces the risk of bicycle damage or theft. Bike rack design and site location are discussed in detail in the Bicycle Parking Guidelines, developed by the Association of Pedestrian and Bicycle Professionals (available on the resources page at www.apbp.org). Bike lockers

provide added protection from theft and weather. Bike parking is important at destinations such as town centers, historic sites, transit stations and park-and-ride lots. It is also important to provide bike parking near business entrances and at employment sites.

Railroad Crossings

At diagonal at-grade railroad crossings, the gap next to the rail (called the "flangeway") can trap the front wheel of a bicycle, thereby causing a bicyclist to crash. This problem is generally a concern in locations where the rails intersect with the roadway at an angle less than 45 degrees to the direction of travel.



Recommended Design Treatment at Diagonal Railroad Crossings (Source: Oregon DOT)

Skewed Railroad Crossing in Madison, Wisconsin

In locations where this condition is present, the bicycle lane or shoulder should be designed so as to enable the bicyclist to approach the track at an angle closer to 90 degrees, but not less than 60 degrees, without having to swerve into motor vehicle travel lanes. The width of the dimensions of the widened area will be dependent upon the skew of the railroad tracks relative to the bicyclist crossing point. It is important that the bicyclist is given sufficient space on the approach and the departure of the crossing to safely transition back to the traveled way. An example of this widening treatment is shown in the Figures above.

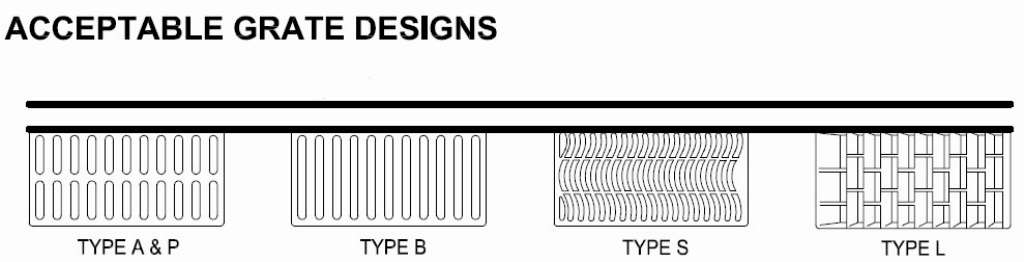
W10-12

In locations where a retrofit may not be feasible or where the retrofit may not occur for a period of time, the *Manual on Uniform Traffic Control Devices* (MUTCD) includes the

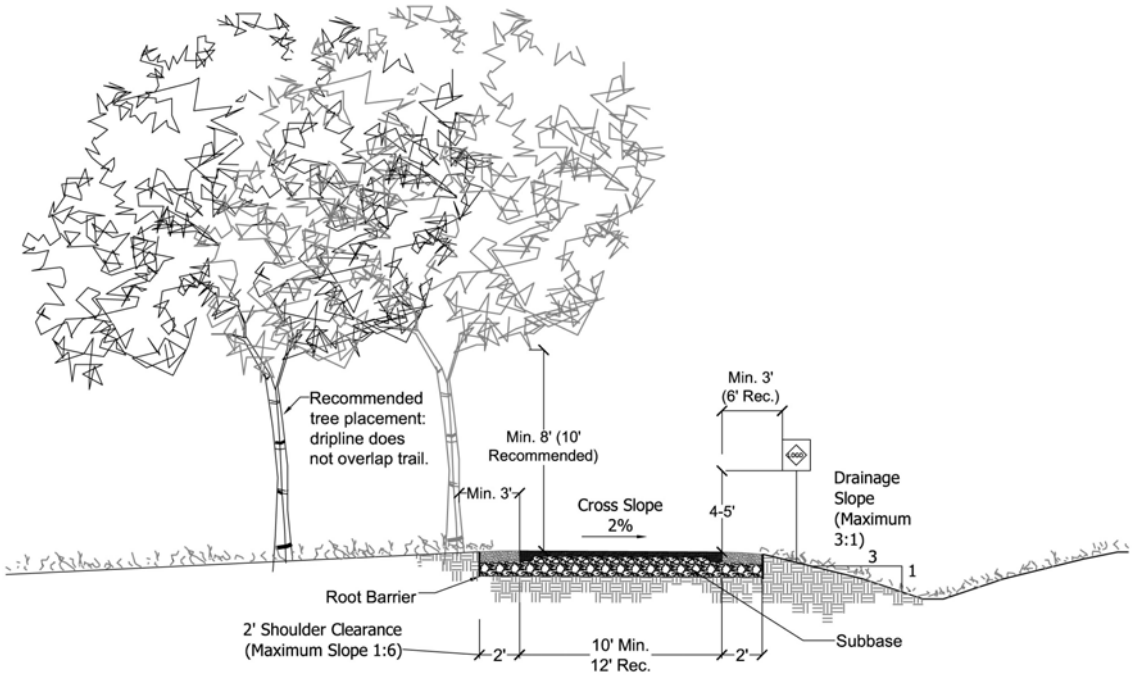
W10-12 warning sign which should be used to warn bicyclists skewed railroad crossings. See above for an example of this sign. A filled or rubberized flangeway can also help to reduce, but not eliminate the risk of a trapped wheel.

Bicycle Friendly Drainage Grates

Storm grates pose a hazard for bicyclists when the openings are parallel to the bicyclists' direction of travel. Bicycle tires can get caught between the bars of these grates, and cause bicyclists to crash. Non-bicycle friendly drain grates should be replaced with one of the types shown in the figure below.



Acceptable Drainage Grate Designs
Source: City of Baltimore Bicycle Facility Design Toolkit



Typical shared-use path cross-section

Shared Use Paths

Shared Use Paths (multi-use trails) serve a wide variety of users, including pedestrians, bicyclists, and in-line skaters. Shared use paths should be designed with consideration given to the volumes, various speeds and space requirements of different user groups. According to the AASHTO *Guide for the Development of Bicycle Facilities*, shared use paths should be designed with a minimum cross section of 10 feet with 2 foot shoulders. This will enable the trail to operate as a two way facility. In areas with high volumes of trail users, 12-14 foot widths are recommended. In extremely constrained conditions, or for neighborhood trail connectors, trail width can be reduced to 8', however this is generally only appropriate for short sections of trails, and according the to *AAHSTO Guide,* the following conditions should prevail: "(1) bicycle traffic is expected to be low, even on peak days or during peak hours, (2) pedestrian use of the facility is not expected to be more than occasional, (3) there will be good horizontal and vertical alignment providing safe and frequent passing opportunities, and (4) during normal maintenance activities the path will not be subjected to maintenance vehicle loading conditions that would cause pavement edge damage."

Trail users generally co-exist on shared use paths without requiring separate lanes for pedestrian versus bicycle traffic. For trails with extremely high volumes of pedestrians, however, it can sometimes be helpful to provide a center line stripe to minimize conflicts and improve the safety and comfort of the users.

Soft surface hiking, mountain biking, and equestrian trails that are not constructed with a paved surface are generally regarded as recreational trails. Since these trails are not intended for transportation use, they may be considerably narrower, and are not required to follow the design guidelines described in this section.

Trail Surface Comparison									
Trail Surface	Relative Cost	Relative Durability	Permeable	ADA Compliant	Use by Road Bikes (Narrow Tires)	Use by Mt Bikes (Wide Tires)	Use by Walkers	Use by Runners	Use by Skaters
Wood/Mulch	Low	Poor	Yes	No	Poor	Fair	Good	Fair	Very Poor
Crushed & Compacted Stone	Low	Fair	Yes	Possibly	Fair	Good	Good	Very Good	Very Poor
Porous Asphalt	High	Good	Yes	Yes	Good	Good	Very Good	Good	Good
Asphalt Pavement	High	Good	No	Yes	Good	Good	Very Good	Good	Very Good
Concrete Pavement	Very High	Very Good	No	Yes	Good	Good	Very Good	Poor	Good

Table: Comparison of different trail surface types

Surface Types

Asphalt or concrete are the preferred surface types for shared use paths. In some circumstances it may be appropriate to construct the path with a soft surface. Soft surface trails are generally not recommended in areas prone to flooding or where steep grades would cause the erosion of the trail surface. The surface should be designed to withstand the loads transferred by the heaviest maintenance vehicle intended to travel along the pathway. The trail surface should be designed with appropriately compacted subgrade, and the correct sub-base and pavement thickness in order to accommodate maintenance and emergency vehicles that will access the trail. Due to the wide variation in soil types and drainage conditions, the pavement structure and subsurface drainage should be designed to the specific conditions of each trail project.

Accessibility

The Americans with Disabilities Act (ADA) prohibits public entities from designing new facilities or altering existing facilities, including sidewalks and trails, that are not accessible to people with disabilities. Shared use paths should comply with the guidelines set forth in the Americans with Disabilities Act Accessibility Guidelines (ADAAG). The design for accessibility should also be applied to all connections to the shared use path including parking lots,

neighborhood connectors, adjoining roadways, and adjoining facilities (rest stops, buildings, restrooms, etc.)

Cross slopes on shared use paths should not exceed 2%. Running grades should be kept to a minimum to provide for maximum accessibility. Every effort should be made to ensure running grades are kept within ADA guidelines on shared use paths. In limited circumstances where achieving these grades would be prohibitively expensive or would denigrate a unique natural environment, exceptions can be made to running grade requirements. Making such an exception does not eliminate the responsibility to meet ADA guidelines on all other aspects of trail design. The following steps should be taken to mitigate steeper grades in these situations:

- Provide flat landings with benches to enable trail users to stop and rest if necessary
- Provide hand rails on the sides of the trail
- Widen the trail to allow more space for slower users
- Provide an alternative accessible route and use signage to direct people with physical disabilities to the route

Steep downgrades are not recommended at roadway intersection approaches. Every effort should be made to keep intersection approaches at or below a 5% slope in order to reduce the possibility of a bicyclist or other wheeled user losing control and crashing into the intersection.

Shoulders

Two-foot wide graded shoulders should be provided along the entire length of the path unless right of way is constrained. The shoulders should typically be of some soft material to serve walkers and runners who prefer soft surfaces.

Liability

The "Recreational Use Statute" is a Virginia law that offers liability protection for land owners that allow recreation uses, such as shared use paths, on their land. Landowners offering public use of their land are not required to keep their premises safe or to warn visitors of hazardous conditions, structures, or activities on their property. Landowners cannot, however, deliberately endanger people who enter for recreational purposes. Under the law, the landowner can be owner, tenant, lessee, occupant, or person in control of the premises. Both private and public land managers are defended. Those who enter privately owned lands for recreation are responsible for exercising due care in their use of the land.

This liability protection is not valid if the landowner collects fees or rent for the use of the land. The exception can be if the land is leased to a government agency that then manages the property.

Driveways and intersections create conflicts between bicyclists on sidepaths/sidewalks and motor vehicles

Example of an intersection treatment on a sidepath

Shared use paths Adjacent to Roadways/ Sidepaths/ Wide Sidewalks

Shared use paths adjacent to roadways, also known as sidepaths or wide sidewalks, can provide a more comfortable place for novice bicyclists and other people who are not comfortable riding on the road with traffic. However, shared use paths adjacent to roadways are most appropriate in corridors with few driveways and intersections. This is because these locations present a safety problem due to conflicts between turning motorists and bicyclists. The photo to the left demonstrates such a conflict: the motorist in the driveway is looking to the left for breaks in traffic and does not see the bicyclist approaching from his right.

It is recommended that shared use paths not be used adjacent to roadways when there are more than 8 driveway or intersection crossings per mile. Special signing and marking treatments are recommended to warn both motorists and bicyclists about driveways and intersections with sidepaths. An example of a pavement treatment to alert bicyclists of a roadway crossing is shown in the photo to the left.

When a shared use path is used on only one side of the roadway, special consideration should also be given to intersection treatments to aid bicyclists into crossing to the other side of the road.

Greenway Signage, Trailheads and Other Trail Amenities

There are several excellent sources for information on greenway signage, trailheads, and other trail amenities. For more information, refer to the following publications:

- *Greenways: A Guide to Planning, Design and Development*. Published by Island Press, 1993. Authors: Charles A. Flink and Robert Searns. www.greenways.com
- *Trails for the Twenty-First Century*. Published by Island Press, 2001. Authors: Charles A. Flink, Robert Searns, and Kristine Olka. www.greenways.com

Pedestrian Facilities along the Roadway

Sidewalks

Sidewalks are a central component of the pedestrian network. Decisions on whether to provide a sidewalk should not be based on existing pedestrian volumes because they are not a reliable indication of pedestrian demand. Individuals tend to walk in locations where continuous connections are provided. A lack of pedestrian activity in a location with discontinuous sidewalks is, therefore, not necessarily an indication of a lack of pedestrian demand.

Great sidewalks encourage walking

All roadways should have some type of walking space outside of the vehicular travelway, whether a sidewalk in urban or suburban areas, or a paved shoulder in rural areas. When a walkway is provided on only one side of the roadway, pedestrians traveling on the opposite side may not cross to the sidewalk, and may instead elect to walk in the roadway. If pedestrians do cross, they increase their exposure to vehicular traffic. Though it may be appropriate for some roadways in developing areas to temporarily have a pedestrian walkway only on one side, walkways on both sides are necessary for pedestrian-compatible roadways.

Sidewalk installation should be a routine part of road improvement and new construction projects in urban and suburban areas. Sidewalks should be included on both sides of all roadways (except where pedestrians are prohibited)

in Winchester, the Town of Stephens City and within Frederick County's Urban Development Area (UDA) and should be a minimum of 5-feet wide. Sidewalks should comply with the most recent Americans with Disabilities Act Guidelines. Development in all three jurisdictions is also subject to compliance with the International Building Code (IBC). Sidewalks serving as Accessible Routes must meet the requirements of IBC Section 1104, as amended, which requires accessible routes on private property between accessible building entrances and public streets or sidewalks in addition to routes between the building entrances and handicap parking spaces.

Striped/Paved Shoulders

Sidewalks are the preferred facilities for pedestrians walking alongside roadways, but paved shoulders can also help accommodate pedestrians in rural areas where sidewalk installation is prohibitively expensive and pedestrian demand is low. In these areas, paved shoulders can also accommodate equestrians. There is no minimum width for paved shoulders, however a width of at least 4 feet is preferred. Greater widths provide better accommodation for pedestrians. On some roadways, motor vehicle travel lanes can be narrowed to provide more shoulder space. According to the *AASHTO Guide for the Development of Bicycle Facilities* (1999), "where 4-foot widths cannot be achieved, any additional shoulder width is better than none at all." Paved shoulders also improve safety for motor vehicles, prevent pavement damage to the travel lanes, and provide space for pedestrians.

Buffer Zones

A pedestrian's safety and comfort in the roadway environment is affected by the width and quality of the buffer between the sidewalk and the roadway. Physical barriers between the sidewalk and roadway (such as street trees, landscaping, bike lanes and parked cars) will increase pedestrian safety and comfort, and therefore encourage higher levels of walking.

On-street parking has a very positive effect on pedestrian comfort. Along some arterial and collector streets in areas that are seeking to enhance and/or introduce a commercial core (with stores/businesses in front and parking lots behind), it may be feasible to add on-street parking lanes.

Street trees greatly enhance the pedestrian environment. For narrow landscape buffers less than 5 feet wide, care should be taken to use shade tree species that can survive in a narrower space and have less invasive root systems, such as varieties of maple and oak trees. Large shade trees are preferred to medium and small trees that do not offer as much shade.

Street trees should typically be placed no closer than 30 feet on center, and no greater than 60 feet on center, depending on the species of tree. In locations with no buffer strip, consideration can be given to providing tree planting behind the sidewalk, which may improve aesthetic conditions and provide shade, but will not improve pedestrians' sense of safety in the roadway environment. Planting trees behind the sidewalk should not be done in new developments or retrofits where there is room for a buffered planting strip. Street trees should not be positioned so as to block sight distances at intersections and driveways.

Design of Driveways and Commercial Entrances

Example of a sidewalk continuing over a driveway in Winchester, VA.

Example of a driveway entrance that functions like an intersection (in the Town of Stephens City). In this example, it is recommended that crosswalk markings be added. The detectable warnings do not meet the requirements of the Americans with Disabilities Act Accessibility Guidelines.

In locations where a sidewalk crosses a driveway, it is important that the sidewalk is continuous and meets the requirements of the Americans with Disabilities Act Accessibility Guidelines for accessible pedestrian routes. Therefore, the cross slope of the driveway at the sidewalk should not exceed 2%. The concrete sidewalk surface should extend across the driveway to give drivers the expectation that they should yield to pedestrians.

Major driveways or commercial entrances may function like street intersections, in which case they should contain the same pedestrian safety features as intersections. In this case, curb ramps, detectable warnings, and crosswalk markings should be used to provide a continuous pedestrian route. A preferred design option is to provide a raised pedestrian crossing over the driveway apron.

The raised pedestrian crossing serves to slow traffic as it enters and exits the driveway.

Roadway Crossing Facilities for Pedestrians and Bicycles

Safe and convenient roadway crossings will be essential for pedestrian and bicycle mobility in the Winchester-Frederick region. This section will provide guidelines for the design of pedestrian crosswalks at intersections and midblock locations as well as guidelines for the design of shared use paths where they cross roadways. Note that designating pedestrian and bicycle crossings with marked crosswalks alone does not necessarily provide an adequate level of safety for pedestrians and bicyclists. Roadways with higher motor vehicle speeds and volumes require enhanced pedestrian and bicycle crossing treatments, including appropriate features from the list below.

Where to Mark Crosswalks

Legally, crosswalks exist where two streets intersect whether or not they are denoted with markings. Crosswalk markings are desirable in certain places because they alert motorists to locations where they should expect pedestrians and show pedestrians a preferred crossing location.

Controlled Locations

Locations with traffic signals or stop signs are known as controlled locations. Within the Winchester-Frederick region, marked crosswalks shall be provided across all street approaches to signalized intersections (on all legs of the intersection except those legs where a pedestrian crossing is prohibited). Marked crosswalks should also be provided at stop controlled intersections.

Uncontrolled Locations

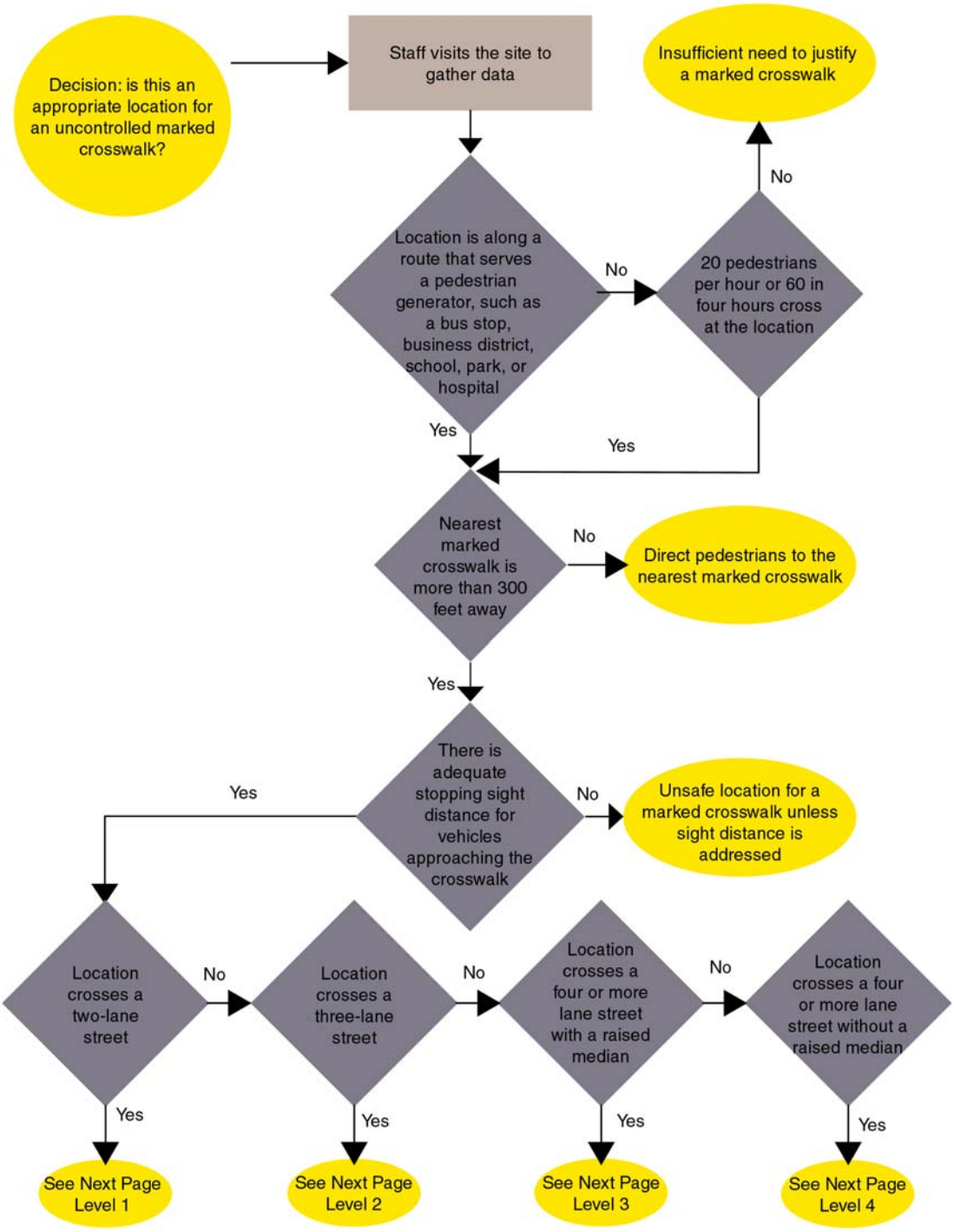
A recent national research project completed by the Federal Highway Administration (Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations, 2002) provides specific guidance on the installation of crosswalks and other safety measures at uncontrolled locations. In addition to providing criteria for when to use marked crosswalks, this study clearly indicates the safety value of enhanced pedestrian crossing measures at midblock crossings and other uncontrolled locations (such as T-intersections). Safety measures that are recommended include crossing islands, raised crossings, and other traffic calming techniques, as well as additional warning signs and signal treatments.

The flow chart shown in on the next page should be used to determine the appropriate safety treatment for an uncontrolled crossing based on vehicular speeds and volumes. Based on the outcome of the flow chart, further guidance is given in the table on the following page regarding the appropriate type of design

treatment, given the amount and speed of traffic at this location. The intent of the flow chart is to provide initial guidance on whether an uncontrolled location might be a candidate for a marked crosswalk alone and/or whether additional geometric and/or traffic control improvements are needed.

As a part of the review process for pedestrian crossings, an engineering study should be used to analyze such other factors, including (but not limited to), gaps in traffic, approach speed, sight distances, illumination, the needs of special populations, and the distance to the nearest traffic signal.

The spacing of marked crosswalks in uncontrolled situations should also be considered so that they are not placed too close together. Overuse of marked crosswalks may breed driver disrespect for them, and a more conservative use of crosswalks is generally preferred. Thus, it is recommended that in situations where marked crosswalks alone are acceptable, a higher priority be placed on their use at uncontrolled locations having a minimum of 20 pedestrian crossings per peak hour (or 15 or more elderly and/or child pedestrians per peak hour). In all cases, good engineering judgment must be applied. (Zegeer et. al., 2002).



Sources: Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations, 2002 and City of Sacramento Public Works Department

Flow Chart: Where to mark crosswalks at uncontrolled locations

Instructions: Complete the flow chart from the previous page and refer to the corresponding level below.

Level 1: 2 Lane Street

ADT	POSTED SPEED		
	30 mph or less	35 mph	40 mph or more
Up to 12,000 cars per day	Longitudinal or diagonal crosswalk markings	Longitudinal or diagonal crosswalk markings	Longitudinal or diagonal crosswalk markings plus an engineering treatment (see below)
12,000-15000	Longitudinal or diagonal crosswalk markings	Longitudinal or diagonal crosswalk markings	Pedestrian signal or grade separated crossing
15,000 cars or more per day	Longitudinal or diagonal crosswalk markings	Longitudinal or diagonal crosswalk markings plus an engineering treatment (see below)	Pedestrian signal or grade separated crossing

Level 2: 3 Lane Street

ADT	POSTED SPEED		
	30 mph or less	35 mph	40 mph or more
9,000 cars or fewer per day	Longitudinal or diagonal crosswalk markings	Longitudinal or diagonal crosswalk markings	Longitudinal or diagonal crosswalk markings plus an engineering treatment (see below)
9,000-12,000	Longitudinal or diagonal crosswalk markings	Longitudinal or diagonal crosswalk markings plus an engineering treatment (see below)	Longitudinal or diagonal crosswalk markings plus an engineering treatment (see below)
12,000-15,000	Longitudinal or diagonal crosswalk markings plus an engineering treatment (see below)	Longitudinal or diagonal crosswalk markings plus an engineering treatment (see below)	Pedestrian signal or grade separated crossing
15,000 or more	Longitudinal or diagonal crosswalk markings plus an engineering treatment (see below)	Pedestrian signal or grade separated crossing	Pedestrian signal or grade separated crossing

Level 3: 4 or more Lanes with a Raised Median

ADT	POSTED SPEED		
	30 mph or less	35 mph	40 mph or more
9,000 cars or fewer per day	Longitudinal or diagonal crosswalk markings	Longitudinal or diagonal crosswalk markings	Longitudinal or diagonal crosswalk markings plus an engineering treatment (see below)
9,000-12,000	Longitudinal or diagonal crosswalk markings	Longitudinal or diagonal crosswalk markings plus an engineering treatment (see below)	Pedestrian signal or grade separated crossing
12,000-15,000	Longitudinal or diagonal crosswalk markings plus an engineering treatment (see below)	Longitudinal or diagonal crosswalk markings plus an engineering treatment (see below)	Pedestrian signal or grade separated crossing
15,000 or more	Pedestrian signal or grade separated crossing	Pedestrian signal or grade separated crossing	Pedestrian signal or grade separated crossing

Level 4: 4 or more Lanes without a Raised Median

ADT	POSTED SPEED		
	30 mph or less	35 mph	40 mph or more
9,000 cars or fewer per day	Longitudinal or diagonal crosswalk markings	Longitudinal or diagonal crosswalk markings plus an engineering treatment (see below)	Pedestrian signal or grade separated crossing
9,000-12,000	Longitudinal or diagonal crosswalk markings plus an engineering treatment (see below)	Longitudinal or diagonal crosswalk markings plus an engineering treatment (see below)	Pedestrian signal or grade separated crossing
12,000-15,000	Pedestrian signal or grade separated crossing	Pedestrian signal or grade separated crossing	Pedestrian signal or grade separated crossing
15,000 or more	Pedestrian signal or grade separated crossing	Pedestrian signal or grade separated crossing	Pedestrian signal or grade separated crossing

Menu of Engineering Treatments

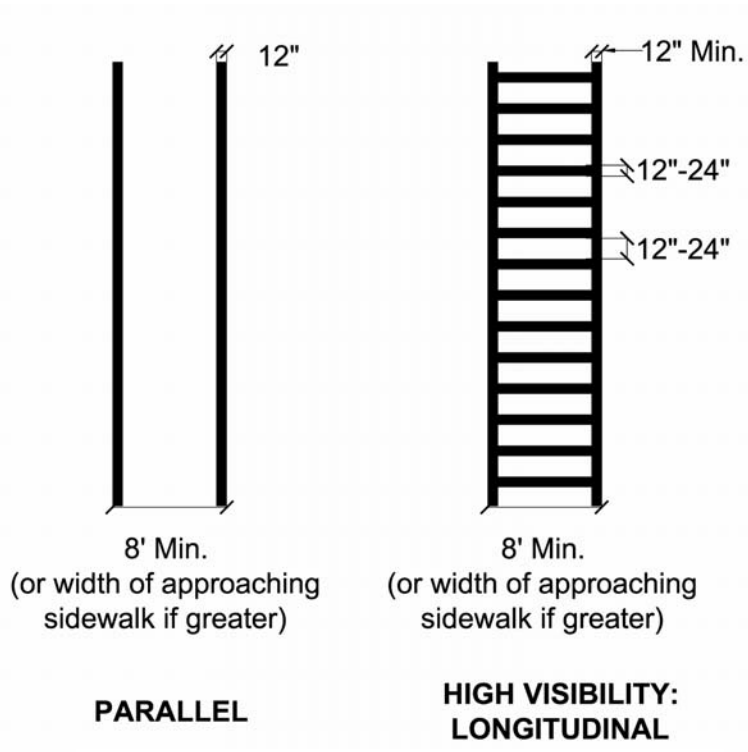
Road Diet
Crossing Islands
Curb Extensions
Advance Stop Lines
In-Roadway Warning Lights
Pedestrian Signals
Grade Separated Crossing (should not be used in conjunction with longitudinal or diagonal crosswalk markings)

Table: Where to mark crosswalks at uncontrolled locations

Crosswalk Marking Types

High visibility longitudinal crosswalk markings, as shown below, are the preferred type of crosswalk marking because they are more the most visible marking, especially at night. If marked with thermoplastic, these markings will be extremely durable. Parallel crosswalk markings are appropriate for many intersections of minor neighborhood streets.

Visibility of various types of crosswalk markings: the high-visibility markings shown in the photo to the right are the easiest for motorists to see



Parallel and high-visibility crosswalk markings

Decorative crosswalk markings, such as those made from stamped colored asphalt, are generally difficult to maintain over the long term and have not been proven to increase pedestrian safety. These crosswalks are often provided to improve the aesthetics, but over time their color fades and they become difficult to distinguish from the asphalt roadway.

If decorative crosswalk markings are to be used, the crosswalk should be outlined with two 12 inch parallel reflective white lines. This will make the decorative markings more visible, particularly at night. The decorative crosswalk material should have integral color so the color will not wear off over time.

Tools to Increase the Safety of Marked Crosswalks at Pedestrian and Bicycle Crossings

This section will present a series of tools that can be used in conjunction with the crosswalk flow chart and table presented earlier. These tools should be used in conjunction with marked crosswalks in order to increase the safety of pedestrian crosswalks and bicycle trail crossings. Generally, the tools are appropriate at both controlled and uncontrolled locations.

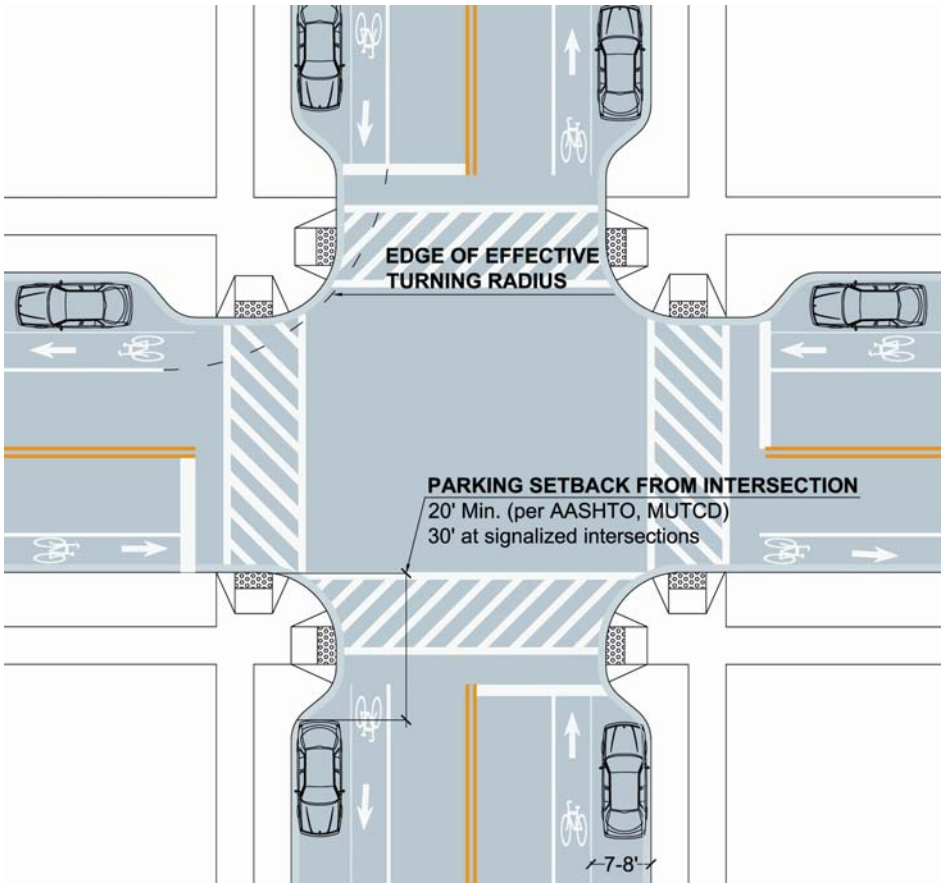
Medians or pedestrian crossing islands

Medians or pedestrian crossing islands can be provided at roadway intersections to give pedestrians a refuge area in the middle of the roadway and allow them to negotiate one direction of traffic at a time. Studies show that they reduce pedestrian crashes. Median islands can be particularly beneficial at intersections with high volumes of motor vehicles, high volumes of pedestrians, and long pedestrian crossing distances. They should be given strong consideration at locations where crossing distance exceeds 60 feet. The desirable minimum width for medians or crossing islands is eight feet. All crossing islands must be accessible to persons with disabilities.

Example of a Pedestrian Crossing Island

Curb extensions

Curb extensions (also known as bulb-outs or neckdowns) extend the curb out into the parking lane, which reduces the effective street width. This reduces the pedestrian crossing distance and makes pedestrians more visible to approaching vehicles. Curb extensions also visually narrow the roadway, which can help reduce motor vehicle speeds. They are only appropriate on roadways with on-street parking.



Example of curb extensions

Reduced turning radii

The turning radii at the corners of roadway intersections should be the smallest possible for the circumstances, rather than designed for the largest possible design vehicle. Small curb radii have numerous benefits: when compared to larger turning radii, they improve visibility between pedestrians and drivers, they reduce the distance of roadway that pedestrians must cross, they reduce vehicular speeds during turning movements, they provide space for curb ramps, and they allow more on-street parking spaces to be provided along a street.

Raised crosswalks

Raised crosswalks provide a continuous route for pedestrians at the same level as the sidewalk. Approaching vehicles must slow down to go over raised crosswalks comfortably. This encourages motorists to yield and makes crossing the street safer for pedestrians. Pedestrians are also positioned slightly higher than the road surface, which makes them more visible to approaching motorists. Pavement markings on the slope of the raised crosswalk can improve the visibility of the raised crosswalk to motorists.

In-Roadway Pedestrian Crossing Signs
In-roadway pedestrian crossing signs placed in the middle of the road at marked crosswalks. They remind drivers of their responsibility to yield to pedestrians in the crosswalk. These signs have been used throughout Virginia (the signs read, "Virginia State Law—Yield to Pedestrians in Crosswalk"). In-street pedestrian crossing signs are included in Section 2B.12 of the Manual on Uniform Traffic Control Devices (MUTCD).

High-visibility advance warning signs
Advance warning signs can be posted to make drivers more aware of key pedestrian crossings. These signs can increase awareness of pedestrians, especially in areas where pedestrians may not be expected. A new fluorescent yellow/green color is approved in the national Manual on Uniform Traffic Control Devices and can be used on these signs (the W11-2 Pedestrian Crossing Sign). According to the MUTCD, these signs "should only be used at locations where the crossing activity is unexpected or at locations not readily apparent." Signs may also be accompanied by flashing lights, in appropriate situations, to grab the attention of drivers. Signs should be used judiciously—too many signs can cause visual clutter and lead to non-compliance.

Signalized Intersections

In some high-speed, high-volume, multi-lane locations, the best way to provide a safe pedestrian crossing may be with a traffic signal. In these locations, and in other locations where traffic signals are warranted, the following tools are recommended to improve the safety and convenience of pedestrians.

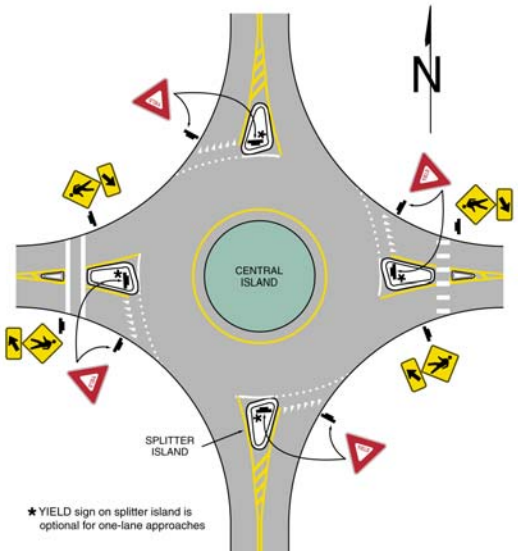
Pedestrian countdown signals
Pedestrian signal heads should be provided at all intersections that have traffic signals. Pedestrian countdown signals are recommended for most intersections. Countdown signals provide pedestrians with amount of time that they have available to complete crossing the street. Countdown signals are included in the Manual on Uniform Traffic Control Devices (MUTCD). They are are especially beneficial at intersections with long crossing distances because they indicate clearance time for pedestrians to complete crossing the street.

Leading Pedestrian Interval

At signalized intersections with high crossing volumes, the signals can be programmed to allow pedestrians to begin crossing before the vehicle traffic on the parallel street is given a green light (assuming that signal control systems at particular intersections allow this type of programming). A study of a three-second leading pedestrian interval (LPI) found that the LPI decreased conflicts between turning motor vehicles and increased the percentage of motorists that yielded to pedestrians in the crosswalk[8].

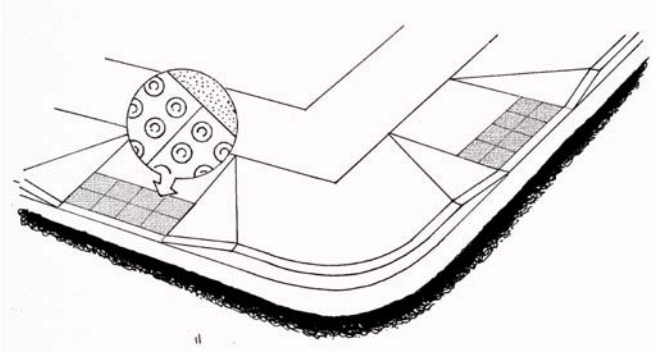
Roundabouts

Roundabouts should be designed to safely accommodate pedestrians and bicyclists. When designing roundabouts, careful application should be made of the requirements specified in the *Manual on Uniform Traffic Control Devices (MUTCD)*.

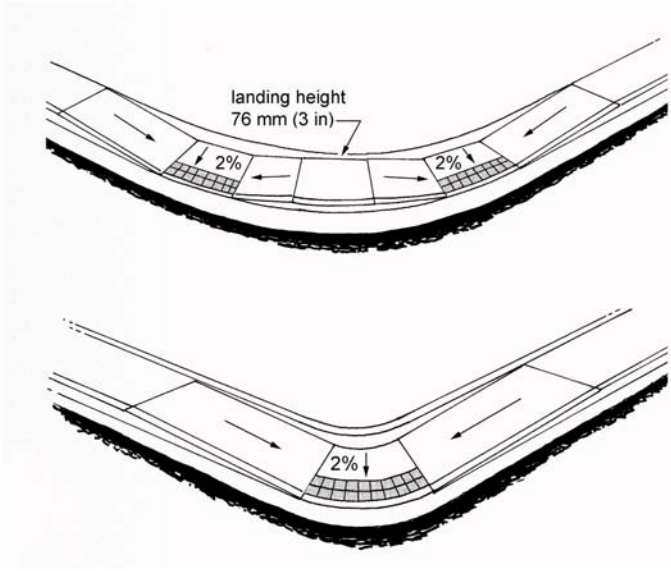


Example of roundabout design
Source: MUTCD

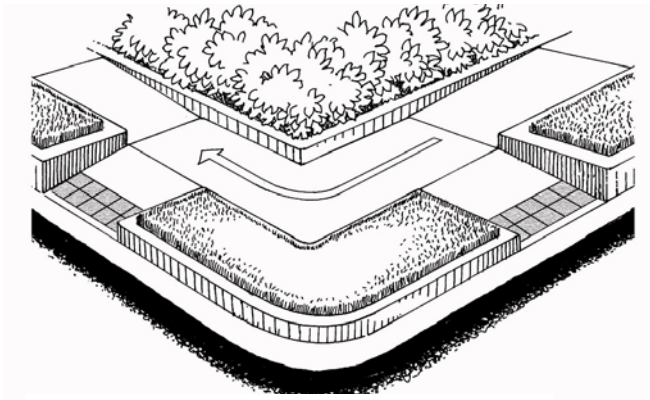
[8] Van Houten, R., R. A. Retting, C. M. Farmer, J. Vanhouten, and J. E. L. Malenfant. "Field Evaluation of a Leading Pedestrian Interval Signal Phase at Three Urban Intersections," Transportation Research Record 1734, 2000.



Example of Flared Perpendicular Curb Ramps
Source: Designing Sidewalks and Trails for Access, Part 2



Examples of Parallel Curb Ramps
Source: Designing Sidewalks and Trails for Access, Part 2



Example of Combined Perpendicular and Parallel Curb Ramps
Source: Designing Sidewalks and Trails for Access, Part 2

Curb ramps

Curb ramps (wheelchair ramps) are required at all pedestrian crossings. The ideal for pedestrian accessibility is for two curb ramps to be provided per corner at all intersections. Curb ramps provide access between the sidewalk and the street for people using wheelchairs, riding scooters, and pushing strollers.

Examples of different types of curb ramps are shown to the left (perpendicular, parallel, and combined perpendicular and parallel). Perpendicular curb ramps are preferred, but due to site restraints and the requirement that a level landing be provided at both the top and bottom of the ramp, parallel ramps or combined perpendicular and parallel ramps may be necessary.

Curb ramps must meet the requirements of the Americans with Disabilities Act Accessibility Guidelines. Additional information on the design of curb ramps may be found in *Designing Sidewalks and Trails for Access, Part 2, Best Practices Design Guide* (Distributed by the U.S. Department of Transportation).

Other Pedestrian and Bicycle Facilities

Roadway Lighting

Pedestrians are adversely affected by low-light conditions: two-thirds of pedestrian fatalities occur between dusk and dawn. Lighting is important at intersections and midblock crossings, particularly in locations near transit stops.

In pedestrian-oriented areas, it is important to provide a higher quality of pedestrian lighting, particularly along sidewalks and walkways with higher volumes of night-time pedestrian activity, specifically in commercial pedestrian districts, in high density residential areas, and near colleges and universities.

Preferred pedestrian-scale lighting is characterized by shorter light poles (i.e. 16-foot tall posts), lower levels of illumination (except at crossings), shorter spacing between lamp posts, and lamps that produce a better color definition and "white light" to areas with higher pedestrian volumes.

Distinctive pedestrian lamp posts may be used to improve the appearance of the streetscape. Light poles should be placed either in the buffer zone, or on the other side of the sidewalk – and not within the sidewalk travelway (maintain the required clear width, per current accessibility standards).

Light poles should be constructed of durable, corrosion resistant materials. Poles located at the back of the sidewalk or within turf or landscaped areas must be raised six to ten inches above the adjacent ground on concrete pedestals. Attention should be given to placing light fixtures within reach of a maintenance vehicle parked on the adjacent roadway, to avoid damage to the adjacent sidewalk and landscaped areas. Street lampposts, pedestrian lampposts, and landscape plans must be coordinated to assure that the lights are not engulfed in a canopy of trees.

Crosswalks should be illuminated at each end by a standard street lamp.

Bicycle and Pedestrian Access on Bridges

Pedestrian and bicycle accommodations should be provided on bridges. On urban and suburban bridge projects, shoulder width should be based on anticipated (20 year) traffic volumes, as shown in the table below. Sidewalks on bridges should be wider, if possible, than sidewalks on the bridge approaches. Pedestrians should not be forced to walk uncomfortably close to a wall or barrier. In general, a 2 foot shy distance is needed adjacent to a wall or a vertical curb. A barrier between the sidewalk and the curb may be needed on roadways with

volumes that exceed 20,000 vehicles per day and/or operating speeds that exceed 45 mph, or in locations with high volumes of heavy vehicles.

Projected Traffic Volumes (20 Year)	Preferred Shoulder Width	Preferred Sidewalk width (min)
<15,000 ADT 15,000> ADT	5 feet 6.5 feet	5.5 feet 8 feet*

* Consider combining sidewalk and shoulder space behind a barrier

Table: Sidewalk and Shoulder Widths on Urban and Suburban Bridges

For bridges that have an existing or proposed shared use path approaching one side, the bridge should be constructed with a 10 foot wide minimum (12 foot wide preferred) shared use path on that side, which will consist of a raised wide sidewalk with a curb. Depending upon the speed and volume of motor vehicle traffic, it may be necessary to separate the path from the adjacent vehicular lanes with a barrier. Transitions at the bridge approaches should enable access to the pathway on the bridge by bicyclists who may be riding on the paved shoulder rather than on the pathway.

Barrier and Railing Design

Barriers that are used to separate the sidewalk and/or bikeway from adjacent motor vehicle lanes can be constructed of various materials and various heights, depending upon the amount of desired separation (considering the speed and volume of traffic, the amount and mix of pedestrian and bicycle users, etc.) This is an area of design that requires engineering judgment and attention to the overall appearance of the bridge. It is not recommended that barriers be used when they are not needed, as they tend to trap trash and other debris and are difficult to maintain.

Bridge railings (on the outside edges of the bridge) should be constructed to a height of 54" from the surface of the pathway.

Bridge Retrofit Projects

Bridges can be retrofitted to better accommodate bicyclists and pedestrians. There are a variety of ways to accomplish this:

- Reduce the width and/or number of travel lanes to create more space for bicycles and/or pedestrians. For example, a narrow sidewalk can be widened to provide for a more comfortable pedestrian environment, while maintaining adequate shoulder width for on-road bicycling.
- Adding a new bicycle and pedestrian structure to the existing bridge structure. In some cases, bridge footers may have been constructed in

anticipation of a future roadway widening, or it may otherwise be possible to add an additional structure for pedestrians and bicyclists.

Bicycle and Pedestrian Access at Interchanges

Interchanges and other locations with on-ramps and off-ramps can be among the most difficult locations for pedestrians and bicycles to navigate. The combination of high speed merging traffic and crossings by pedestrians and bicyclists creates inherent conflicts and can be very uncomfortable for non-motorized users. Particularly in urban and suburban locations where pedestrian and bicycle traffic can be expected to use the roadway, interchange design should account for their needs.

When an intersection is converted to an interchange, pedestrian and bicycle access should be considered in the design of interchange ramps and all other crossings.

The most important principle in designing interchanges that accommodate pedestrians and bicyclists is to reduce motor vehicle speeds at locations where pedestrians and bicyclists either cross the road, or (as in the case with bicyclists operating on-road) merge with traffic. For this reason, urban interchange design with conventional 90 degree intersections (instead of merge lanes) is preferable for pedestrian and bicycle safety. Interchange designs that enable motor vehicles to maintain speeds above 30 mph without stopping are not conducive to pedestrian and bicycle access and should be avoided.

Appendix B: Ordinance Review

Chapter 4 of this plan recommends that local plans and ordinances be updated to strengthen the requirements for pedestrian and bicycle accommodation. This Appendix provides guidance on how the plans and ordinances could be changed, and includes some example language from model ordinances throughout the United States.

Comprehensive Plans

Local comprehensive plans should set the vision for walkability and bicycle friendliness. Pedestrian and bicyclist considerations should be incorporated into sections that discuss parks and recreation, transportation, and land use.

Parks and Recreation Section

The Parks and Recreation components of Comprehensive Plans should incorporate bicycle and pedestrian recommendations for the region from the soon to be released 2007 *Virginia Outdoors Plan*. Walking and bicycling facilities should continue to be included as potential facilities in neighborhood, community, and regional parks. This section should also include mountain bike trails as a separate facility type for parks.

Example Comprehensive Plan Language

The 2001 Isle of Wight County, Virginia Comprehensive Plan includes the following objective related to bicycling and walking:

- Establish methods to acquire, develop, and maintain open space buffers for development of trail corridors, particularly in greenways adjacent to stream corridors or former rail rights-of-way which offer leisure recreation facilities, protect sensitive environmental resources, and enhance the quality of life for County residents. Where possible, select locations for trail construction that foster use of greenways and provide opportunities to establish and interconnected system of trails and greenways over time.

Transportation Section

The Transportation component of Comprehensive Plans should provide a strong vision for interconnected streets with pedestrian and bicycle facilities throughout the City of Winchester, the Town of Stephens City, and the Frederick County Urban Development Area. Narrow streets, short blocks, narrow travel lanes, and an interconnected street system should be encouraged in order to promote pedestrian and bicycle activity. This section should also encourage connectivity

of the pedestrian and bicycle network. This section should also include a new goal to decrease the need for automobile trips by encouraging mixed-use developments, pedestrian pathways, and bicycle facilities.

Example Comprehensive Plan Language

The Transportation Section of the 2001 Isle of Wight County, Virginia Comprehensive Plan includes the following text:

- Beyond a strict capacity-based approach to highway systems evaluation, consideration of the impact of roads and traffic and community character also needs to be considered.

Additionally, this Section includes the following implementation strategies related to bicycling and walking:

- Decrease the need for automobile trips by encouraging mixed-use developments, pedestrian pathways, and bike paths.
- Integrate Land Uses where appropriate
    - Integrating housing into overall design of large scale employment or commercial service centers will help reduce the need to travel. Homes built in proximity or immediately adjacent to the workplace or shops not only reduce vehicle miles of travel, but also present opportunities for workers to walk or bike to work.
- Encourage Proffers
    - Indicate the need for dedication of rights-of-way for new roads, for road extensions, and to widen existing highways, or establish greenways, bikeways, and trails through the Transportation Plan and Capital Improvements Program.

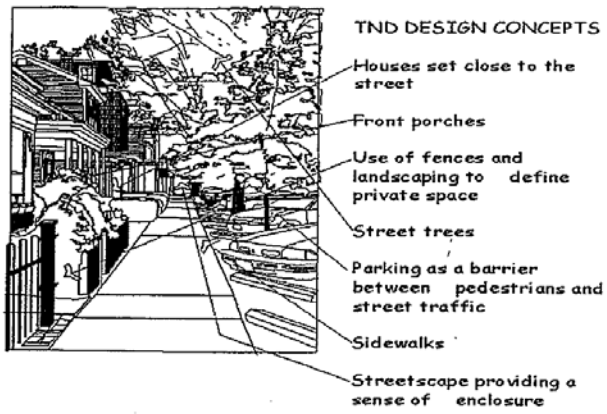
Land Use Section

The ease of bicycle and pedestrian travel is closely linked to land use. The Land Use component of Comprehensive Plans should support development with mixed uses and with adequate density to support pedestrian and bicycle travel. Connected roadway systems (rather than cul-de-sacs) should be encouraged.

Example Comprehensive Plan Language

The Land Use Section of the 2001 Isle of Wight County, Virginia Comprehensive Plan includes the following text encouraging mixed use activity centers:

Mixed Use Activity Centers represent opportunities to cluster future development into regional centers which serve the commercial services and retail shopping needs of current and future County residents. Each Mixed Use Activity Center should provide opportunities to establish a recognizable center of development with its own unique "sense of place" within the County. Future development form within each Activity Center will vary somewhat based on the existing pattern of development and the future development mix which occurs. However, the County should encourage, traditional neighborhood development (TND) form within Mixed Use Activity Centers. Characteristics of this form of development are readily apparent in the Town of Smithfield and include:



- mixed land uses
- grid street patterns
- design emphasis on pedestrian circulation
- intensively used open spaces and often a "village green" to provide orientation and define a village center.
- clearly defined streetscapes by virtue of smaller front yards on narrow lots that foster a sense of enclosure and a sense of community
- architectural character reminiscent of the late 19th and early 20th Century

Each Mixed Use Activity Center, however, should generally evolve as a mixed-use regional center for residential, office, retail, and service development. Light industrial development may also be appropriate in some Activity Centers in the form of well-planned business and industrial parks.

Zoning and Subdivision Ordinances:

Local Zoning and Subdivision Ordinances should be revised to incorporate the requirements set forth in Appendix A, Bicycle and Pedestrian Facility Design Guidelines. These ordinances should require that ADA-accessible sidewalks are provided on *both* sides of all streets (except those where pedestrians are prohibited) and that they should be a minimum width of 5 feet. It is also recommended that the ordinances be revised to require developers to provide a minimum 5-feet buffer space between the sidewalk and the street. In the case of subdivisions, the ordinances should be clear that developers are required to provide sidewalks along the existing streets that the subdivision fronts, as well as the new streets within the subdivision. Pedestrian walkways should also be required through parking lots and connecting from the sidewalk along the street to the building entrance.

Example Subdivision Regulations, Nashville, TN, April 2006.

3-8 Requirements for Sidewalks and Related Pedestrian Facilities

1. *Requirements for Sidewalks on New Subdivision Streets.* Sidewalks shall be located within the right-of-way on both sides of new public and private streets, including new extensions of existing streets. All sidewalks and pedestrian ways constructed upon public rights-of-way shall be in accordance with the adopted construction standards of Metro. Sidewalks shall not be required:
    1. On new subdivision streets in industrial zoning districts.
    2. On new streets in residential subdivisions where the base zoning district requires a minimum lot area of at least 20,000 square feet and the area of each lot to be platted remains 20,000 square feet or greater.
    3. Where all interior lots of an infill development, as defined in Section 7-2, are accessed from permanently dead-ended street(s) of no more than 750 feet in length, sidewalks are not required along the dead-end street(s).
    4. Where a development regulated by an Urban Design Overlay, or other district governed by urban design standards, sets out special design intentions that exclude sidewalk on a street at the neighborhood edge, if approved by the respective decision-making body, either the Metropolitan Council or the Planning Commission.
2. *Requirements for Sidewalks on Existing Streets Fronting the Property Subdivided.*
    1. *Applicability.*
        1. The requirements and procedures of the Zoning Ordinance shall apply for construction of sidewalks along existing collector or arterial streets in association with non-residential or multi-family developments. The requirements and procedures of the Subdivision Regulations apply for all other development conditions.
        2. The requirements of Section 3-8.2.b for sidewalk construction shall not apply to any property outside of the Urban Services District where the Sidewalk Priority Index (SPI) score is less than 20, as determined by the planning department after consulting the appropriate agencies Metro. The Sidewalk Priority Index (SPI) is established in the Strategic Plan for Sidewalks and Bikeways, most recent edition adopted by the Planning Commission, and incorporated herein by reference.

Example Subdivision Regulations, Nashville, TN, April 2006, Continued

2. *Construction of sidewalks where there is an existing sidewalk network is required under the conditions set out in Sections 3-8.2.b.1 to 3-8.2.b.4.* New sidewalks shall comply with the adopted standards of Metro consistent with existing sidewalk development along the block face. Where existing conditions do not meet an adopted standard, a design compatible with existing conditions may be considered and approved by the Planning Commission, upon the advice of the appropriate Metro agencies.

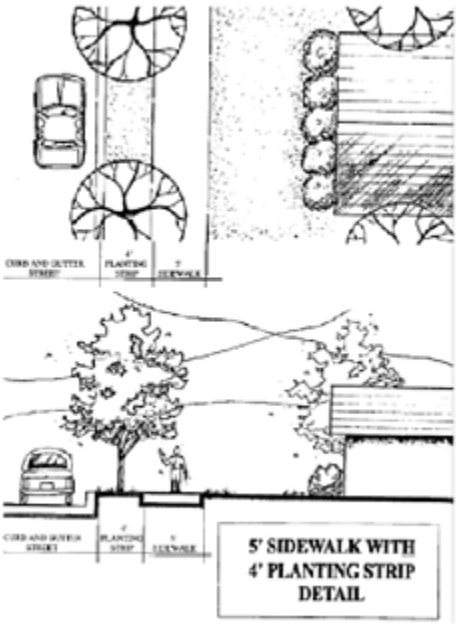
    3. *Existing sidewalk repair or replacement.* Sidewalks on street(s) fronting the property, that do not comply with a standard of Metro consistent with existing sidewalk development on the block face, shall be repaired or replaced as part of a new development.
    4. *New sidewalk to fill a gap in the existing network.* New sidewalk shall be constructed on street(s) fronting the property wherever installation would be contiguous to and connect existing sidewalk segments.
    5. *New sidewalk to extend the existing network.* New sidewalk shall be constructed on street(s) fronting the property wherever installation would be adjacent to and extend an existing sidewalk.
    6. *New Sidewalk on the same block face as existing sidewalk.* New sidewalk shall be constructed on street(s) fronting the property wherever public sidewalk already exists on the same block face.

3. *Construction of sidewalks or financial contribution to the pedestrian network.* When the conditions of 1 and 2 of this Section do not apply, the developer remains responsible for sidewalk(s) along street(s) fronting the property being subdivided, but may either construct a sidewalk or make a financial contribution to Metro in lieu of constructing, in accordance with this Section. When built, new sidewalks shall comply with the standards of Metro; however, a design compatible with existing conditions may be considered and approved by the Planning Commission, upon the advice of the appropriate Metro agencies.
    1. *Exception.* Only those lots platted that create a new or additional development right are subject to the sidewalk requirement of this Section.
    2. *Alternative Pedestrian Trail.* When an alternative pedestrian trail or greenway trail meeting Metro Greenways' design standards is proposed to be constructed by the developer, and the trail substantially serves the same purpose as a sidewalk along an existing street required by this Section, then the applicant may construct the trail as a substitute for that sidewalk section.

Example Subdivision Regulations, Nashville, TN, April 2006, Continued

3. *Contribution to the Pedestrian Network as an Alternative to Sidewalk Installation.* Where permitted by Section 3-8.2.b., the developer may make a financial contribution to Metro in lieu of construction. The value of said contribution shall be the average linear foot sidewalk project cost, determined on an annual basis by the Public Works Department review of sidewalk projects contracted for or constructed by Metro. Any such payments received by Metro shall be assigned and designated for implementation of the Strategic Plan for Sidewalk Capital Improvements, as amended from time to time. The fee in lieu of sidewalk construction shall be used to accommodate pedestrian needs within the pedestrian benefit zone in which the development property is located. The applicant's payment shall be allocated within 24 months of receipt of the payment; otherwise, said payment shall be refunded to the subdivision applicant.
    1. *Fee Deadline.* Prior to the recording of a final plat for the applicable phase(s) of any subdivision, the applicant shall either pay all in-lieu fees with a cashier's check or post a performance agreement with an accompanying security document, as defined in Section 6-1.2 of these regulations. Partial payments of the in-lieu fee (i.e. combinations of cash and surety) shall not be accepted.
    2. *Security Document.* Performance agreements shall be reviewed annually by the planning department in accordance with its established performance agreement procedures. However, in-lieu fee performance agreements are not eligible for reduction. The security document shall be released once full payment of the in-lieu fee is made by cashier's check to the Public Works Department. Payment of the in-lieu fee shall be made:
        1. Prior to the release of any bond covering roads and drainage or,
        2. For projects without a bond for roads and drainage, for the same development phase to which the in-lieu fee applies.
4. *Sidewalk Dimensions.* The minimum width of public sidewalks shall be five feet. Where concrete curbs are required or constructed, grass or landscaped areas or strips with a minimum width of four feet shall separate all sidewalks from the adjacent street, except within ten feet of a street intersection. (see figure 3-1).

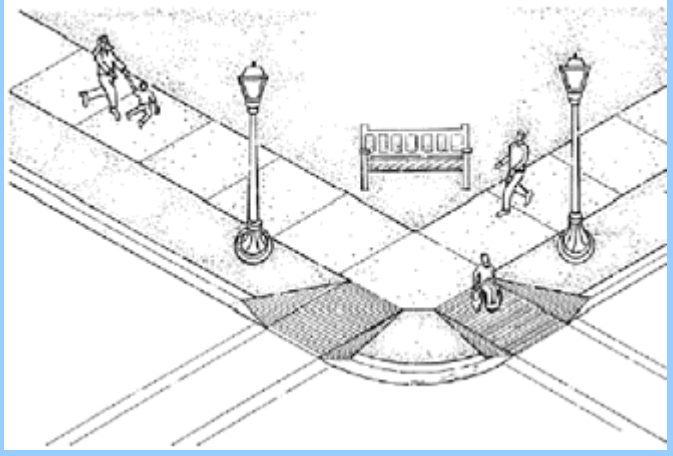
Figure 3-1: Sidewalk Dimensions



Example Subdivision Regulations, Nashville, TN, April 2006, Continued

5. *Sidewalk Encroachments/Obstructions.* Encroachments including, but not limited to utility poles, fire hydrants, parking meters, mailboxes, sign standards, and street furniture shall not be located within the concrete portion of the sidewalk area, unless determined to be compliant by the Public Works Department. However, tree grates, utility grates, and manholes may be permitted within a sidewalk provided five feet of unobstructed clearance is provided on one side, unless less clearance is determined to be compliant by the Public Works Department. (see figure 3-2)

Figure 3-2: Sidewalk Encroachments/Obstructions



6. *Sidewalk Tree Preservation.* When specimen quality trees or other natural features exist, that are desired to be preserved or protected, in the path of a sidewalk, the sidewalk may be located so as to preserve those features. Under such conditions, the sidewalk may be located within a pedestrian easement outside of the dedicated public right-of-way. Exceptions to allow a non-contiguous pedestrian easement may be considered by the Planning Commission, after obtaining a recommendation from the appropriate Metro agencies.
7. *Sidewalk Pedestrian Easements.* To facilitate pedestrian access from streets to existing or planned schools, museums, parks, greenways, playgrounds, or other nearby community facilities, major shopping malls, or commercial amusement activities, the Planning Commission or the Executive Director of the Planning Department may require perpetual unobstructed easements or dedications of land measuring at least ten feet in width on a subdivision plat. Easements shall be indicated on the plat as a "public pedestrian access easement."

Ordinances should also require the provision of street trees and lighting. Full cut-off lighting should be required along streets and placed at all pedestrian crossing locations. Bicycle lanes should be required on all new roadways except local streets. Bicycle parking requirements are also recommended for inclusion for commercial, institutional, and multi-family uses (an example is shown in the following table).

Example Minimum Bicycle Parking Requirements for Zoning Ordinance, Portland, Oregon	
Type of Establishment	**Minimum Number of Bicycle Parking Spaces**
Primary or secondary school	10% of the number of students, plus 3% of the number of employees.
College or university classrooms	6% of the number of students, plus 3% of the number of employees.
Dorms, fraternities and sororities	One space per 3 residents.
Commercial – retail or office	One space per 3,000 sq. ft. of commercial space or 5-10% of the number of automobile spaces.
Sport and recreation center	10-20% of the number of automobile spaces.
Movie theater or restaurant	5-10% of the number of automobile spaces.
Industrial	2-5% of the number of automobile spaces.
Multi-unit housing	1 space per 1-2 apartments.
Public transit stations	Varies, depending on usage.

Preliminary sketches, subdivision design plans, and final plats should be required to show all pedestrian, bicycle, and trail facilities. These drawings should also be required to show pedestrian, bicycle, and trail facilities on adjacent properties. Neither the Winchester Zoning Ordinance nor the Frederick County Subdivision Ordinance explicitly require that Site Plans show proposed pedestrian and bicycle facilities in context with the existing facilities on adjacent properties. Requiring the location of such facilities on adjacent properties will make it easier to determine whether pedestrian and bicycle facilities will be interconnected.

Including overlay districts as part of a Zoning Ordinance, such as the City of Winchester's Corridor Enhancement District, is an effective way to require higher standards for pedestrian and bicycle facilities in certain desirable locations. Consider taking the following language from the Corridor Enhancement District section of the City of Winchester's Zoning Ordinance and placing it in the broader ordinances for both the City, Town, and County, "Site Access: Provisions shall be made for connectivity of sidewalks to adjacent parcels, and inter-parcel access from existing/proposed off-street parking areas to parking areas on adjacent parcels, where appropriate." This provision would apply to multi-family residential and commercial uses.

The Frederick County Subdivision Ordinance currently states, "The Planning Commission may waive the sidewalk requirement along local streets when pedestrian walkways are provided that allow pedestrian access to each lot or use. Such walkways must provide appropriate connections to pedestrian systems on adjoining properties." This statement should be removed. Generally, pedestrians who are walking from one destination to another prefer to walk the most direct route possible and this route is along the roadway. Providing off-road trails

within a subdivision should be encouraged (and in some cases, required), however this does not eliminate the need for sidewalks, as neighborhood residents need a means by which to access the trail system without being forced to walk in the road.

In the Frederick County Subdivision Ordinance, commercial and industrial subdivisions are currently exempt from the requirements for sidewalks and pedestrian walkways. It is recommended that this exemption be removed or clarified (see Nashville example) because it is particularly important that commercial properties have sidewalks along the roadway and leading to the commercial entrance.

Urban Design Guidelines

The recommendations presented above for comprehensive plans, zoning ordinances, and subdivision ordinances are useful for establishing basic requirements for pedestrian and bicycle-friendly design. To go a step further, the County, City, and Town could adopt Urban Design standards to require certain zoning districts to meet an even higher standard of pedestrian and bicycle-friendly design.

Example Urban Design Guidelines: A Model Ordinance for a Traditional Neighborhood Development - Wisconsin

4.5 Lot and Block Standards.
1. Block and lot size diversity. Street layouts should provide for perimeter blocks that are generally in the range of 200-400 feet deep by 400-800 feet long. A variety of lot sizes should be provided to facilitate housing diversity and choice and meet the projected requirements of people with different housing needs.

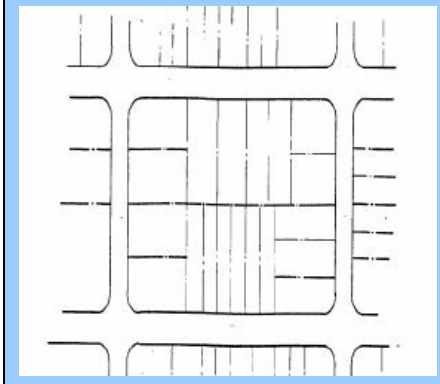


Figure 4*. Plan-view diagram of a street grid showing a diversity of lot (parcel) sizes.*

3. Building Setback, Front - Mixed Use Area. Structures in the mixed use area have no minimum setback. Commercial and civic or institutional buildings should abut the sidewalks in the mixed use area.

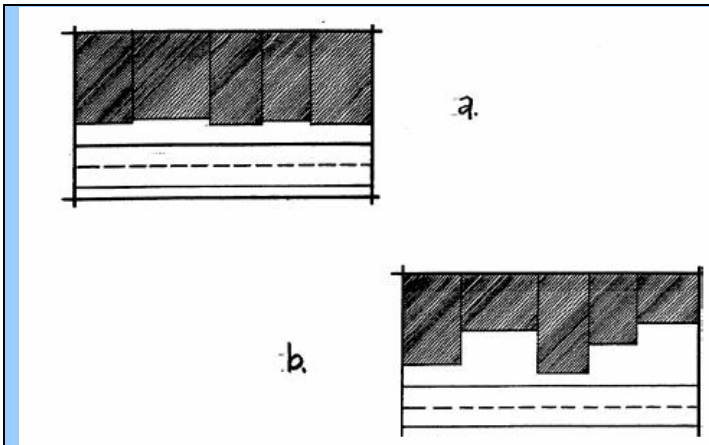


Figure 5. *Plan-view diagrams showing two alternatives for building setbacks from the street right-of-way in mixed-use areas. Relatively uniform setbacks (a) are preferable to widely varying building*

4. Building Setback, Front - Areas of Mixed Residential Uses. Single-family detached residences shall have a building setback in the front between [0 and 25] feet. Single family attached residences and multifamily residences shall have a building setback in the front between [0 and 15] feet.

5. Building Setback, Rear - Areas of Mixed Residential Uses. The principal building on lots devoted to single-family detached residences shall be setback no less than [30] feet from the rear lot line.

6. Side Setbacks. Provision for zero lot-line single-family dwellings should be made, provided that a reciprocal access easement is recorded for both lots and townhouses or other attached dwellings, provided that all dwellings have pedestrian access to the rear yard through means other than the principal structure.

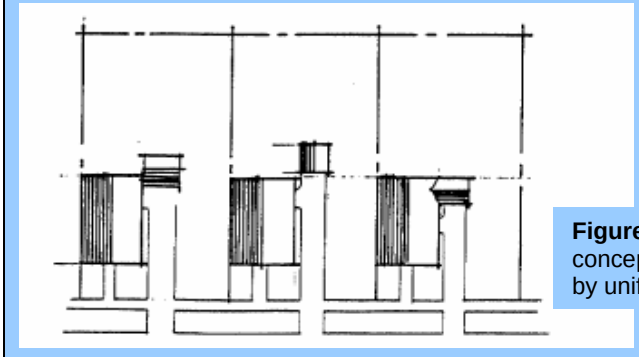


Figure 6. Plan-view diagram of the "zero-lot line" concept. A large side-yard on each parcel is created by uniformly eliminating one of the side-yard setbacks.

4.6 Circulation Standards. The circulation system shall allow for different modes of transportation. The circulation system shall provide functional and visual links within the residential areas, mixed use area, and open space of the traditional neighborhood development and shall be connected to existing and proposed external development. The circulation system shall provide adequate traffic capacity, provide connected pedestrian and bicycle routes (especially off street bicycle or multi-use paths or bicycle lanes on the streets), control through traffic, limit lot access to streets of lower traffic volumes, and promote safe and efficient mobility through the traditional neighborhood development.

1. **Pedestrian Circulation**. Convenient pedestrian circulation systems that minimize pedestrian-motor vehicle conflicts shall be provided continuously throughout the Traditional Neighborhood Development. Where feasible, any existing pedestrian routes through the site shall be preserved and enhanced. All streets, except for alleys, shall be bordered by sidewalks on both sides in accordance with the specifications listed in Table 1. The following provisions also apply:

a. Sidewalks in residential areas. Clear and well-lighted sidewalks, [3-5 feet] in width, depending on projected pedestrian traffic, shall connect all dwelling entrances to the adjacent public sidewalk.
b. Sidewalks in mixed use areas. Clear and well-lighted walkways shall connect building entrances to the adjacent public sidewalk and to associated parking areas. Such walkways shall be [a minimum of 5 feet] in width.
c. Disabled Accessibility. Sidewalks shall comply with the applicable requirements of the Americans with Disabilities Act.
d. Crosswalks. Intersections of sidewalks with streets shall be designed with clearly defined edges. Crosswalks shall be well lit and clearly marked with contrasting paving materials at the edges or with striping.

2. **Bicycle Circulation**. Bicycle circulation shall be accommodated on streets and/or on dedicated bicycle paths. Where feasible, any existing bicycle routes through the site shall be preserved and enhanced. Facilities for bicycle travel may include off-street bicycle paths (generally shared with pedestrians and other non motorized users) and separate, striped, 4 foot bicycle lanes on streets. If a bicycle lane is combined with a lane for parking, the combined width should be 14 feet.
3. **Public Transit Access**. Where public transit service is available or planned, convenient access to transit stops shall be provided. Where transit shelters are provided, they shall be placed in highly visible locations that promote security through surveillance, and shall be well-lighted.
4. **Motor Vehicle Circulation**. Motor vehicle circulation shall be designed to minimize conflicts with pedestrians and bicycles. Traffic calming features such as "queuing streets," curb extensions, traffic circles, and medians may be used to encourage slow traffic speeds.

A. Street Hierarchy. Each street within a traditional neighborhood development shall be classified according to the following (arterial streets should not bisect a traditional neighborhood development):
i. Collector. This street provides access to commercial or mixed -use buildings, but it is also part of the [city/village]'s major street network. On-street parking, whether diagonal or parallel, helps to slow traffic. Additional parking is provided in lots to the side or rear of buildings.
ii. Subcollector. This street provides primary access to individual residential properties and connects streets of lower and higher function. Design speed is 25 mph.
iii. Local Street. This street provides primary access to individual residential properties. Traffic volumes are relatively low, with a design speed of 20 mph.
iv. Alley. These streets provide secondary access to residential properties where street frontages are narrow, where the street is designed with a narrow width to provide limited on-street parking, or where alley access development is desired to increase residential densities. Alleys may also provide delivery access or alternate parking access to commercial properties.

Table 1: Attributes of Streets in a Traditional Neighborhood Development

	Collector	Subcollector	Local Street	Alley
Average Daily Trips	750 or more	750-1500	Less than 250	Not applicable
Right-of-Way	76-88 feet	48-72 feet	35-50 feet	12-16 feet
Auto travel lanes	Two or three 12 feet lanes	Two 10 feet lanes	Two 10 feet lanes, or one 14 feet (queuing) lane	Two 8 feet lanes for two-way traffic, or one 12 feet lane for one-way traffic
Bicycle lanes	Two 6 feet lanes combined with parking lanes	4 feet lanes with no parking, or 6 feet lanes combined with parking lanes	None	None
Parking	Both sides, 8feet	None, one, or both sides, 8 feet	None or one side, 8feet	None (access to individual drives & garages outside Right-of-way)
Curb and gutter	Required	Required	Not required	
Planting strips	Minimum 6 feet	Minimum 6 feet	Minimum 6 feet	None
Sidewalks	Both sides, 5 feet minimum	Both sides, 3-5 feet	Both sides, 3-5 feet	None

b. Street Layout. The traditional neighborhood development should maintain the existing street grid, where present, and restore any disrupted street grid where feasible. In addition:
i. Intersections shall be at right angles whenever possible, but in no case less than 75 degrees. Low volume streets may form three-way intersections creating an inherent right-of-way assignment (the through street receives precedence) which significantly reduces accidents without the use of traffic controls.

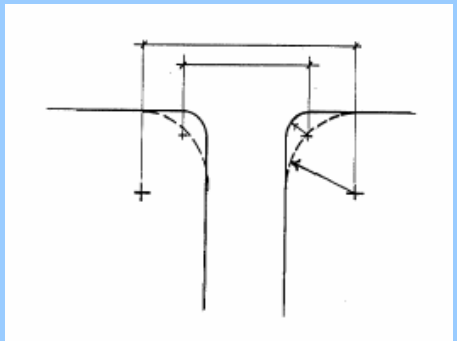


Figure 8. *Plan-view diagram of a street intersection. Reducing the radius of street corners slows turning vehicle traffic and shortens pedestrian crosswalks.*

ii. Corner radii. The roadway edge at street intersections shall be rounded by a tangential arc with a maximum radius of [15 feet] for local streets and [20 feet] for intersections involving

collector or arterial streets. The intersection of a local street and an access lane or alley shall be rounded by a tangential arc with a maximum radius of 10 feet.

iii. Curb cuts for driveways to individual residential lots shall be prohibited along arterial streets. Curb cuts shall be limited to intersections with other streets or access drives to parking areas for commercial, civic or multifamily residential uses. Clear sight triangles shall be maintained at intersections, as specified below, unless controlled by traffic signal devices:

intersection of:	**minimum clear sight distance:**
local street and collector	[120 feet]
collector and collector	[130 feet]
collector and arterial	[50 feet]

iv. The orientation of streets should enhance the visual impact of common open spaces and prominent buildings, create lots that facilitate passive solar design, and minimize street gradients. All streets shall terminate at other streets or at public land, except local streets may terminate in stub streets when such streets act as connections to future phases of the development. Local streets may terminate other than at other streets or public land when there is a connection to the pedestrian and bicycle path network at the terminus.

c. Parking requirements. Parking areas for shared or community use should be encouraged. In addition:
i. In the mixed use area, any parking lot shall be located at the rear or side of a building. If located at the side, screening shall be provided as specified in section 4.8.
ii. A parking lot or garage may not be adjacent to or opposite a street intersection.
iii. In the mixed use area, a commercial use must provide one parking space for every [500] square feet of gross building area.
iv. Parking lots or garages must provide not less than one bicycle parking space for every [10] motor vehicle parking spaces.
v. Adjacent on-street parking may apply toward the minimum parking requirements.
vi. In the mixed residential areas, parking may be provided on-site. [One] off-street parking space with unrestricted ingress and egress shall be provided for each secondary dwelling unit.
vii. Multi - family uses must provide one parking space for every dwelling unit and [0.5] parking space for each additional bedroom.

Appendix C: Definitions

Bicycle Facilities: General term denoting improvements and provisions made by public agencies to accommodate or encourage bicycling, including parking and storage facilities and bikeways.

Bikeway: Bicycle lanes, shared lanes, paved shoulders, wide curb lanes, and shared use paths. These facilities may or may not be marked for preferential or exclusive use for bicyclists.

Bicycle: A device propelled solely by human power, upon which a person may ride either on or astride a regular seat attached thereto, having two or more wheels in tandem, including children's bicycles, except a toy vehicle intended for use by young children. For purposes of Chapter 8 (§ 46.2-800 et seq.) of this title, a bicycle shall be a vehicle while operated on the highway (Code of Virginia § 46.2-100).

Bicycle Lane (Bike Lane): That portion of a roadway designated by signs and/or pavement markings for the preferential use of bicycles, electric power-assisted bicycles, and mopeds (Code of Virginia § 46.2-100).

Bicycle Route: A system of bikeways designated with wayfinding signage, pavement markings, maps or other means.

Buffer Zone: The portion of the sidewalk corridor that is between the through pedestrian zone and the street. This area may contain street trees, newspaper boxes, street signs, etc.

Countdown Pedestrian Signal: A signal face displaying interval countdown in order to inform pedestrians of the number of seconds remaining in the pedestrian change interval.

Cross Slope: The slope that is perpendicular to the direction of travel.

Crosswalk: That part of a roadway at an intersection included within the connections of the lateral lines of the sidewalks on opposite sides of the highway measured from the curbs or, in the absence of curbs, from the edges of the traversable roadway; or any portion of a roadway at an intersection or elsewhere distinctly indicated for pedestrian crossing by lines or other markings on the surface (Code of Virginia § 46.2-100).

Curb Lane: Outermost travel lane adjacent to the shoulder or gutter.

Curb Zone: A portion of the sidewalk corridor, the horizontal surface of the curb.

Detectable: A surface having a continuous edge within 150 mm (6 in) of the surface so that pedestrians who have visual disabilities can sense its presence and receive usable guidance information. (Maryland MUTCD, 2006)

Frontage Zone: The portion of the sidewalk corridor that is between the through pedestrian zone and the right-of-way line. In downtown areas, this is the shy area next to a building where pedestrians tend not to walk. It is typically two feet in width.

Island: A defined area between traffic lanes for control of vehicular movements or for pedestrian refuge. It includes all end protection and approach treatments.

Median: The area between two roadways of a divided highway measured from edge of traveled way to edge of traveled way. The median excludes turn lanes. The median width might be different between intersections, interchanges, and at opposite approaches of the same intersection.

Marked Crosswalk: Any portion of the roadway that is identified for pedestrian crossing by lines or other markings.

Midblock Crosswalk: A crossing location, not at an intersection, marked with crosswalk markings.

Paved Shoulder: A concrete or asphalt portion of the roadway contiguous with the traveled way marked with an edgeline for accommodation of parking, stopped vehicles, emergency use, pedestrian use, or bicyclist use. The minimum paved shoulder width for vehicle use is four-feet exclusive of the gutter. The minimum shoulder width for vehicular parking is eight-feet inclusive of the gutter.

Pedestrian Facilities: A general term denoting improvements and provisions made to accommodate or encourage walking.

Right-of-way: A general term denoting land, property or interest therein, usually in a strip, acquired for or devoted to transportation purposes.

Right-of-Way [Assignment]: The permitting of vehicles, pedestrians, and/or bicycles to proceed in a lawful manner in preference to other vehicles, pedestrians, and or bicyclists by the display of sign or signal indications.

Roadway: That portion of a highway improved, designed, or ordinarily used for vehicular travel and parking lanes, but exclusive of the sidewalk, berm, or shoulder even though such sidewalk, berm, or shoulder is used by persons riding bicycles or other human-powered vehicles. In the event a highway includes two or more separate roadways, the term roadway as used herein shall refer to any such roadway separately, but not to all such roadways collectively.

Roadway Network: A geographical arrangement of intersecting roadways.

Running Slope: The slope that is parallel to the direction of travel.

Shared-Use Path: A bikeway that is physically separated from motorized vehicular traffic by an open space or barrier and is located either within the highway right-of-way or within a separate right-of-way. Shared-use paths may also be used by pedestrians, skaters, users of wheel chairs or wheel chair conveyances, joggers, and other nonmotorized users (Code of Virginia § 46.2-100).

Shoulder: That part of a highway between the portion regularly traveled by vehicular traffic and the lateral curbline or ditch (Code of Virginia § 46.2-100).

Sidewalk: The portion of a street between the curb lines, or the lateral lines of a roadway, and the adjacent property lines, intended for use by pedestrians (Code of Virginia § 46.2-100).

Sidewalk Corridor: The entire sidewalk area made up of the curb zone, buffer zone, through pedestrian zone, and frontage zone.

Shoulder: Paved or gravel area located to the right of the curb lane.

Through Pedestrian Zone: The portion of the sidewalk corridor where pedestrians walk.

Traffic Calming: Physical and other measures used on a highway to reduce the dominance and speed of motor vehicles.

Traffic Control Device: A sign, signal, marking, or other device used to regulate, warn, or guide traffic, placed on, over, or adjacent to a street, highway, pedestrian facility, or shared-use path by authority of a public agency having jurisdiction.

Unmarked Crosswalk: A legal pedestrian crossing that is not indicated with lines or other markings (see the definition for Crosswalk).

Vehicle: Every device in, on or by which any person or property is or may be transported or drawn on a highway, except devices moved by human power or used exclusively on stationary rails or tracks. For the purposes of Chapter 8 (§ 46.2-800 et seq.) of this title, bicycles, electric personal assistive mobility devices, electric power-assisted bicycles, and mopeds shall be vehicles while operated on a highway (Code of Virginia § 46.2-100).

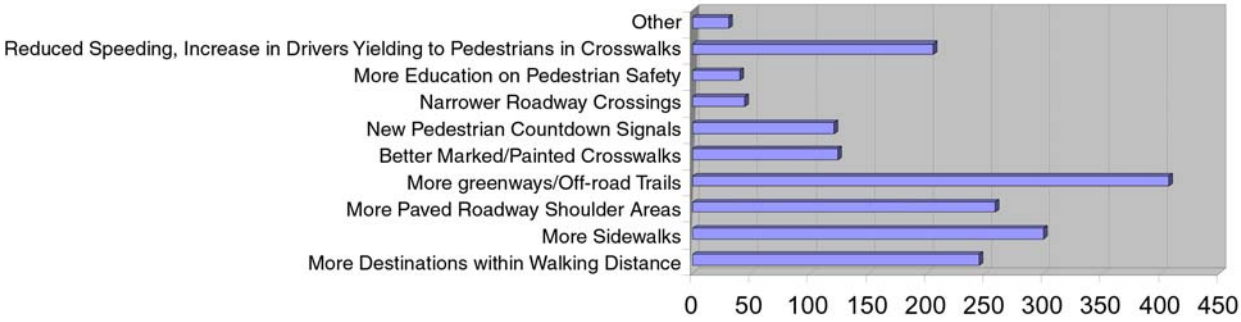
Wheel chair or wheel chair conveyance: A chair or seat equipped with wheels, typically used to provide mobility for persons who, by reason of physical disability, are otherwise unable to move about as pedestrians. The term includes both three-wheeled and four-wheeled devices. So long as it is operated only as provided in § 46.2-677, a self-propelled wheel chair or self-propelled wheel chair conveyance shall not be considered a motor vehicle (Code of Virginia § 46.2-100).

Wide Curb Lane (Wide Outside Lane): A shared travel lane where motor vehicles can pass bicyclists without changing lanes. The lane is the furthest right travel lane and its minimum width is fourteen-feet exclusive of the gutter.

Appendix D: Results from the Online Questionnaire

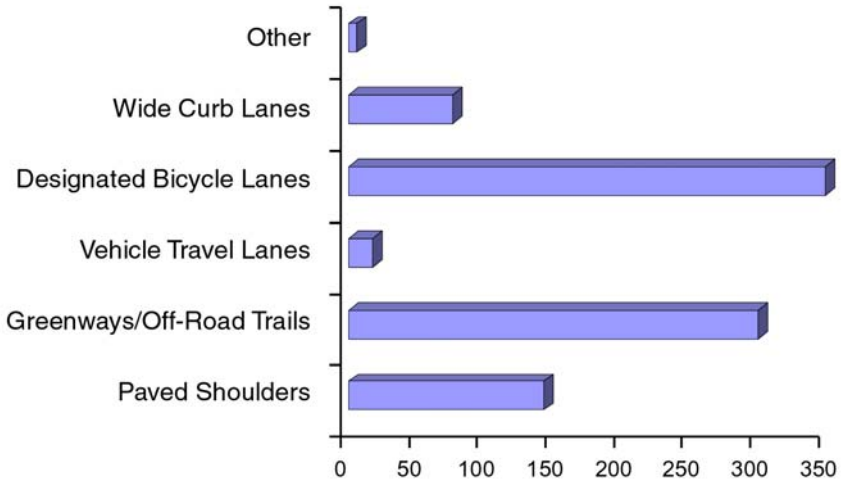
As part of the planning process for this document, an Online Questionnaire was advertised in order to learn more about existing conditions for walking and bicycling in the Winchester-Frederick area. There were 543 respondents to the questionnaire. More than half (56%) of the respondents indicated that there are no sidewalks or trails near their homes, however 96% responded that if there was a sidewalk or a trail near their home they would walk on it. The top two obstacles preventing respondents from walking more is a lack of greenway paths/trails and a lack of sidewalks.

Dangerous/difficult road crossings, heavy traffic, and high-speed traffic were also named as top obstacles. Sixty-five percent of respondents indicated that the opportunity to improve health and fitness is the most appealing aspect of walking. The vast majority of respondents (94%) indicated that public funds should be used to improve pedestrian transportation options.



Which of the following changes would encourage you to walk more often in Frederick County, the City of Winchester, or the Town of Stephens City?

The questionnaire had a separate section on bicycling. Eighty-seven percent of respondents said there was no bicycle trail or signed bicycle route near their home. Ninety-five percent of respondents said that if there was a bicycle trail or signed bicycle route near their home they would ride on it. A lack of bicycle facilities was indicated by 80% of respondents as preventing them from bicycling more often. Eighty-eight percent of respondents said that more bicycle facilities would encourage them to bike more often. Respondents were asked about their preferred types of bicycle facilities. Seventy-eight percent said designated bicycle lanes were among their preferred facility and 67% said greenways/off-road trails were among their preferred facilities.



Which type of bicycle facilities do you prefer to ride on?

The following roadways are the ones that respondents would most like to see pedestrian and bicycle improvements:

- Senseny Road
- Valley Avenue (Route 11)
- Pleaseant Valley Road
- Amherst Street
- Middle Road
- Greenwood Road
- Cedar Creek Grade

More details from the online questionnaire results follow:

Questionnaire for the Win-Fred MPO Bicycle & Pedestrian Mobility Plan

Welcome!

Thank you for your interest in walking and bicycling in Frederick County, the City of Winchester, and the Town of Stephens City, Virginia. Your responses to this questionnaire will provide information that will aid in the development of the WinFred MPO Bicycle & Pedestrian Mobility Plan. The Plan will result in the implementation of projects to improve conditions for walking and bicycling within the WinFred MPO. Even if you don't walk or bike regularly, we would appreciate your feedback. Your responses to this questionnaire will be anonymous. At the end of the questionnaire, you will be invited to provide your e-mail address if you would like to receive updates on the Plan, including the schedule for public meetings.

This short questionnaire includes three parts: 1) pedestrian questions, 2) bicycle questions, and 3) background information questions.

Pedestrian Questions

1. On average, how often do you walk (or use an assistive device, such as a wheelchair) for the following purposes?

	Never/Not applicable	Less than a few times per month	A few times per month	A few times per week	Five or more times a week	Response Total
To work	**86% (432)**	7% (34)	3% (13)	3% (13)	2% (12)	**504**
To shopping or errands	**61% (311)**	18% (94)	12% (60)	6% (28)	3% (16)	**509**
To school	**92% (458)**	3% (16)	2% (10)	1% (7)	1% (7)	**498**
To social/recreational activities	**37% (187)**	24% (123)	19% (99)	14% (70)	6% (31)	**510**
For exercise (no destination)	6% (33)	9% (46)	17% (90)	**37% (194)**	30% (155)	**518**
Other	**47% (120)**	10% (25)	15% (38)	12% (30)	16% (41)	**254**
					Total Respondents	**525**
					(skipped this question)	18

2. Is there a sidewalk or trail near your home?

		Response Percent	Response Total
Yes		43.9%	230
No		**56.1%**	**294**
		Total Respondents	**524**
		(skipped this question)	19

4. Question 3a

3. Do you walk on the sidewalk or trail near your home?

		Response Percent	Response Total
Yes		**96%**	**216**
No		4%	9
		Total Respondents	**225**
		(skipped this question)	318

4. If there was a sidewalk or trail near your home would you walk on it?

		Response Percent	Response Total
Yes		**94.6%**	**281**
No		5.4%	16
		Total Respondents	**297**
		(skipped this question)	246

5. Which of the following prevent you from walking more in Frederick County, the City of Winchester, or the Town of Stephens City? (Choose top 3)			
		Response Percent	Response Total
Travel time (takes too long to reach destinations)		30.2%	160
Lack of sidewalks		57%	302
Lack of greenway paths/trails		**67.4%**	**357**
Poor sidewalk quality		22.3%	118
High-speed traffic		46.2%	245
Heavy traffic		49.8%	264
Dangerous/difficult road crossings		51.9%	275
Inadequate lighting (along roadways or at roadway crossings)		24%	127
Personal security (concerned about crime)		16.8%	89
Other travel modes are safer or more comfortable		11.3%	60
Physical ability		1.9%	10
Hills		1.9%	10
Weather		7.4%	39
View Other (please specify)		4.9%	26
		Total Respondents	**530**
		(skipped this question)	13

6. Which of the following changes would encourage you to walk more often in Frederick County, the City of Winchester, or the Town of Stephens City? (Choose top 3)			
		Response Percent	Response Total
More destinations within walking distance		46.6%	245
More sidewalks		57%	300
More paved roadway shoulder areas		49%	258
More greenways/off-road trails		**77.4%**	**407**
Better marked/painted crosswalks		23.6%	124
New pedestrian countdown signals (signals that count down the time left to finish crossing the street)		23%	121
Narrower roadway crossings (e.g., provide median islands, curb extensions, and/or build narrower roadways)		8.4%	44
More education on pedestrian safety		7.6%	40
Reduced speeding and increase in drivers yielding to pedestrians in crosswalks		39%	205
View Other (please specify)		5.9%	31
	Total Respondents		**526**
	(skipped this question)		17

7. On which roads would you like to see pedestrian improvements, such as sidewalks or better crosswalks/signals (please answer regardless of whether or not you are a pedestrian)? Please be as specific as possible. List the road name and a starting and ending intersection. Feel free to provide additional locations in the comment box at the end of this questionnaire.			
		Response Percent	Response Total
View **Location #1:**		**100%**	**394**
View Location #2:		80.7%	318
View Location #3:		58.9%	232
	Total Respondents		**394**
	(skipped this question)		149

8. How do you feel drivers typically behave around pedestrians in Frederick County, the City of Winchester, or the Town of Stephens City? Please check all that apply.			
		Response Percent	Response Total
Drivers are courteous— they drive slowly when pedestrians are nearby and yield to pedestrians crossing roadways		14.9%	72
Drivers drive too fast		**65.6%**	**316**
Drivers do not yield to pedestrians crossing roadways		54.8%	264
Drivers pass pedestrians walking on the side of the road too closely		56.4%	272
Drivers harass pedestrians		9.1%	44
I do not walk often enough to answer this question		7.7%	37
View Other (please specify)		6.2%	30
		Total Respondents	**482**
		(skipped this question)	61

9. To which destinations would you like to be able to walk (List destinations to which you are currently unable or unwilling to walk)?			
		Response Percent	Response Total
View **Destination #1:**		**100%**	**300**
View Destination #2:		70.3%	211
View Destination #3:		45%	135
		Total Respondents	**300**
		(skipped this question)	243

10. Which aspect of walking is most appealing to you? (Please choose one)			
		Response Percent	Response Total
Improving health and fitness		**65%**	**308**
Less time in the car		1.9%	9
More convenient than other travel modes		0.6%	3
Money saved on fuel		3.4%	16
More time outdoors		13.5%	64
Social interaction		2.1%	10
Environmentally responsible		11.4%	54
View Other (please specify)		2.1%	10
		Total Respondents	**474**
		(skipped this question)	69

11. Should public funds be used to improve pedestrian transportation options?			
		Response Percent	Response Total
Yes		**93.7%**	**443**
No		6.3%	30
		Total Respondents	**473**
		(skipped this question)	70

12. Which types of funds should be the primary funds used to improve pedestrian transportation options?			
		Response Percent	Response Total
Existing local taxes		26.9%	116
New local taxes		11.4%	49
State and federal grants		**52.9%**	**228**
View Other (please specify)		8.8%	38
		Total Respondents	**431**
		(skipped this question)	112

Bicycle Questions

13. How many bicycles do you have in your household?			
		Response Percent	Response Total
0		8.1%	38
1		12.3%	58
2		18.1%	85
3		17.2%	81
4		**23.8%**	**112**
5 or more		20.4%	96
	Total Respondents		**470**
	(skipped this question)		73

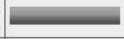
14. Is there a bicycle trail or signed bicycle route near your home?			
		Response Percent	Response Total
Yes		13.5%	63
No		**86.5%**	**405**
	Total Respondents		**468**
	(skipped this question)		75

15. Do you ride on the bicycle trail or signed bicycle route near your home?			
		Response Percent	Response Total
Yes		**58.7%**	**37**
No		41.3%	26
	Total Respondents		**63**
	(skipped this question)		480

16. If there was a bicycle trail or signed bicycle route near your home, would you ride on it?			
		Response Percent	Response Total
Yes		**94.5%**	**381**
No		5.5%	22
		Total Respondents	**403**
		(skipped this question)	140

17. On average, how often do you bicycle for the following purposes?						
	Never/Not applicable	Less than a few times per month	A few times per month	A few times per week	Five or more times a week	Response Total
To work	**83% (352)**	8% (33)	4% (19)	3% (14)	2% (7)	**425**
To shopping or errands	**74% (311)**	12% (52)	9% (37)	4% (17)	1% (4)	**421**
To school	**95% (389)**	2% (10)	2% (7)	1% (3)	0% (2)	**411**
To social/recreational activities	**49% (207)**	19% (80)	18% (75)	9% (40)	5% (21)	**423**
For exercise (no destination)	17% (76)	20% (90)	**26% (120)**	24% (108)	13% (59)	**453**
Other	**64% (84)**	10% (13)	8% (11)	11% (15)	7% (9)	**132**
					Total Respondents	**459**
					(skipped this question)	84

18. Which of the following factors prevent you from bicycling or from bicycling more often? (Choose top 3)			
		Response Percent	Response Total
Travel time (takes too long to reach destinations)		13.2%	61
Lack of bicycle facilities (such as bike lanes, wide travel lanes, paved shoulders, greenway trails, etc.)		**80.1%**	**370**
Heavy traffic		56.3%	260
High-speed traffic		55.4%	256
Dangerous/difficult road crossings		46.1%	213
Narrow roads		40.5%	187
Hills		5.2%	24
Other travel modes are safer or more comfortable		8.4%	39
Pavement quality		17.7%	82
Loose gravel/debris		24%	111
Poor lighting (along roadways or at roadway crossings)		15.2%	70
Personal security (concerned about crime)		8.4%	39
Physical ability		2.8%	13
Weather		7.4%	34
View Other (please specify)		6.5%	30
		Total Respondents	**462**
		(skipped this question)	81

19. Which of the following changes would encourage you to bike more often? (Choose top 3)			
		Response Percent	Response Total
More destinations within bicycling distance		32%	147
More safety education programs and events for new cyclists		9.4%	43
More organized bicycle rides for families and new bicyclists		18.3%	84
More bike parking (such as bike racks or lockers at schools, parks, shopping areas, park and ride lots, offices, etc.)		31.2%	143
More bicycle facilities (such as bike lanes, wide travel lanes, paved shoulders, greenway trails, etc.)		**87.8%**	**403**
Narrower roadway crossings (e.g., provide median islands, curb extensions, and/or build narrower roadways)		10.7%	49
Increased enforcement of laws applying to motorists		33.1%	152
Increased enforcement of laws applying to bicyclists		15.3%	70
Greater availability of showers/changing facilities		4.8%	22
Bicycle route signs		43.4%	199
A map of bicycle routes		38.1%	175
View Other (please specify)		6.3%	29
		Total Respondents	**459**
		(skipped this question)	84

20. Which types of bicycle facilities do you prefer to ride on? (Choose top 2)			
		Response Percent	Response Total
Paved shoulders		31.9%	143
Greenways/off-road trails		67%	300
Vehicle travel lanes (sharing travel lanes with motor vehicle traffic)		4%	18
Designated bicycle lanes		**78.1%**	**350**
Wide vehicle travel lanes (wide curb lanes) (outside lanes with enough space for motor vehicles to pass bicyclists on left side in the same lane		17.2%	77
View Other (please specify)		1.3%	6
		Total Respondents	**448**
		(skipped this question)	95

21. On which roads would you like to see bicycle improvements, such as bicycle lanes, trails, paved shoulders, or safer roadway crossings (regardless of whether or not you are a bicyclist)? Please be as specific as possible. List the road name and a starting and ending intersection. Feel free to provide additional locations in the comment box at the end of this questionnaire.			
		Response Percent	Response Total
View **Road #1:**		**100.3%**	**348**
View Road #2:		84.7%	294
View Road #3:		67.1%	233
		Total Respondents	**347**
		(skipped this question)	196

22. If you bicycle, how do feel drivers typically behave around bicyclists in Frederick County, the City of Winchester, or the Town of Stephens City? Please check all that apply.

	Response Percent	Response Total
Drivers are courteous—they yield and give bicyclists space	12.6%	54
Drivers drive too fast	59.1%	253
Drivers pass bicyclists too closely	**65.9%**	**282**
Drivers harass bicyclists	17.1%	73
Drivers do not yield to bicyclists crossing roadways	39%	167
I do not bicycle often enough to answer this question	15.4%	66
View Other (please specify)	6.1%	26
Total Respondents		**428**
(skipped this question)		115

23. To which destinations would you like to be able to ride a bicycle (List destinations to which you currently are unable or unwilling to ride)?

	Response Percent	Response Total
View **Destination #1:**	**100.4%**	**284**
View Destination #2:	78.1%	221
View Destination #3:	56.5%	160
Total Respondents		**283**
(skipped this question)		260

24. Which aspect of bicycling is most appealing to you? (Please choose one)

	Response Percent	Response Total
Improving health and fitness	**66.8%**	**288**
Less time in the car	1.6%	7
More convenient than other travel modes	0.5%	2
Money saved on fuel	5.1%	22
More time outdoors	14.4%	62
Social interaction	0.7%	3
Environmentally responsible	8.1%	35
View Other (please specify)	2.8%	12
Total Respondents		**431**
(skipped this question)		112

25. Should public funds be used to improve bicycle transportation options?

	Response Percent	Response Total
Yes	**91.5%**	**397**
No	8.5%	37
Total Respondents		**434**
(skipped this question)		109

26. Which types of funds should be the primary funds used to improve bicycle transportation options?

	Response Percent	Response Total
Existing local taxes	27%	106
New local taxes	13.8%	54
State and federal grants	**49.2%**	**193**
View Other (please specify)	9.9%	39
Total Respondents		**392**
(skipped this question)		151

Background Questions

27. What is your age?			
		Response Percent	Response Total
0-9		0.2%	1
10-19		1.6%	7
20-29		6.8%	30
30-39		23.3%	103
40-49		**39.7%**	**176**
50-59		21.7%	96
60 and older		6.8%	30
	Total Respondents		**443**
	(skipped this question)		100

28. What is your gender?			
		Response Percent	Response Total
Male		39%	171
Female		**61%**	**268**
	Total Respondents		**439**
	(skipped this question)		104

29. How many people live in your household?			
		Response Percent	Response Total
1		8.6%	38
2		26.1%	115
3		19.5%	86
4		**27.4%**	**121**
5 or more		18.4%	81
	Total Respondents		**441**
	(skipped this question)		102

30. How long have you lived in Frederick County, the City of Winchester, or the Town of Stephens City?			
		Response Percent	Response Total
Less than 1 year		6.2%	27
1 to 2 years		8.1%	35
3 to 5 years		16.9%	73
6 to 10 years		16.6%	72
More than 10 years		**52.2%**	**226**
	Total Respondents		**433**
	(skipped this question)		110

31. What is your ZIP code?

		Response Percent	Response Total
22601		**34.6%**	**150**
22602		**34.6%**	**150**
22603		9.2%	40
22624		1.2%	5
22625		0.9%	4
22637		0.5%	2
22638		0%	0
22645		1.2%	5
22654		0.5%	2
22655		14.5%	63
22656		1.6%	7
22663		0.2%	1
View Other (please specify)		1.2%	5
	Total Respondents		**434**
	(skipped this question)		109

32. In what neighborhood or subdivision do you live?

View	**Total Respondents**	**358**
	(skipped this question)	185

33. Your Questionnaire is Complete